USEFUL INFO.

Error reader.
The BE-3D chassis supports the use of the Error Reader. This jig, is available under part number S-188-900-10 (price code S).

The displayed code shows the actual error of the TV set. Refer to the service manual or the table below for an explanation of those codes.

ERROR CODES
02 - Protection circuit trip <ANY TIME>
03 - IIC SCL LOW <POWER UP ONLY>
04 - IIC SDA LOW <POWER UP ONLY>
05 - IIC SDA and SCL LOW <POWER UP ONLY>
06 - Jungle/chroma controller no acknowledge <POWER UP ONLY>
07 - Video switch no acknowledge <POWER UP ONLY>
08 - Tuner no acknowledge
09 - MSP no acknowledge
10 - NVM no acknowledge
11 - M3L TXD LOW <POWER UP ONLY>
12 - M3L RXD LOW <POWER UP ONLY>
13 - M3L ENABLE LOW <POWER UP ONLY>
14 - M3L TXD AND RXD LOW <POWER UP ONLY>
15 - Compact Text test fail <POWER UP ONLY>
16 - AV switch cannot power on reset
17 - Cannot initialise jungle
18 - NVM acknowledge fail after initialisation
19 - Multiple devices with no acknowledge <POWER UP ONLY>
20 - Compact Text run-time failure
21 - AVSWITCH response failure after power up
22 - JUNGLE/CHROMA controller response failure after power up
23 - Compact Text does not respond
24 - Sound processor run time failure
25 - M3L bus clock low time-out after data sent (run time failure)
26 - M3L bus clock low time-out afetr data sent (power up)
27 - M3L bus clock low time-out afetr data sent (initialization)
28 - DSP run-time failure.

Replacement of HV transformer.
Two types of high voltage transformer are used (removable or fixed focus cable). When replacing a line transformer, replace using the original type.

Type	Focus cable	Part no.
A	Removable	1-453-169-12
B	Fixed	1-453-220-11

DEFLECT

Lines tearing when hot.
[32in models only]. Replace line driver transformer T804.

No sync in TXT mode.
Replace IC1001.

PICTURE

Horizontal interference in picture during first half hour.
IC606 is defective. Therefor unstable +9V (pin 3 of IC606). Replace 9V regulator IC606.
Ref. Description Location Part no.
IC606 LM2940T-90 D-board PSU 8-759-267-25

Visible arcing interference on screen when appliance does function. Intermittently switches off when switched on.
Replace line output transformer T803.

Partially blanked horizontally.
Check zener diode D817 (RD5.6ESB2) in blanking circuit, for leaks.

Overbright, nearly negative picture.
Access service mode and enter TT07 to clear.

AUDIO

Hum and/or buzz of the headphones and/or speaker when vol. is low.
Deflection unit generates interference. On board A, solder side, add a thick wire AWG18 200mm long between pins 6,7 and 8 of IC203 and pins 29 and 30 of CN1. Given its critical position, the wire must be kept away from board A.
Part no. Ref.
190090227 Wire AWG18

No sound. Headphones OK.
Fau;t 1: [PS6001 O/C]. Replace audio output chip IC1200 (TDA7264).

Distorted or loud crackling from audio.
Check audio demodulator/processor chip IC202 (MSP3410).

POWER

EHT comes up briefly then nothing. No error code.
[Excess current protection system operating]. Check line output transformer T803.

Intermittently switches off when switched on. Visible arcing interference on screen when appliance does function.
Replace line output transformer T803.

Locks when hot.
Replace IC202 (MSP3410).

Shuts down when hot.
Replace IC202 (MSP3410).

FUNCTION

No TXT. No OSD.
Check zener diode D817 (5.1V) on main PCB.

Comes on then switches to standby. Standby LED flashes twice.
(1) Check field output chip IC500 (STV9379).
(2) [OK if D505 disconnected]. Check zener diode D505 (MTZJT7736A) for leaks.
(3) [No change if D505 disconnected]. Replace memory chip NVM IC2.

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Does not got into standby mode completely; picture disappears but line continues to run.
(1) Check Q602, Q603 and Q604 in standby switching circuit. Check reservoir capacitor C615.
(2) [Above components replaced; HT not at 135V]. Replace error detector chip IC602 (SE135N).

Pulses in and out of standby. RY600 clicks each time.
Check Q601 (2SC3852A), D603 (6.8V) zener and R634 (22R) on primary side of PSU.

Degaussing incomplete.
Replace relay RY600 with part number 1-755-018-11.

TUNING/MEMORY

Intermittently channels change.
Replace tactile switches S9001 and S9002 on D board.

GEOMETRY

E-W bowing. Excessive width.
Check R870 (1R/1W).

OTHER

No OSD. No TXT.
Check zener diode D817 (5.1V) on main PCB.

Intermittently volume bar appears.
Replace tactile switches S9001 and S9002 on D board.

Incomplete or messy OSD and menus. TXT OK.
Replace IC1001.

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Sony IK Circuit……. Explained by Dan Mundy, CET/CSM

I have posted this before as a trouble-shooting aid. It should explain what is happening.

I don't have the manual in front of me so this may be a little generic. The IK circuit sends out a 100% white pulse during the vertical blanking interval. There is a pulse for red then green and lastly blue. Each pulse is on a different scan line. The IK circuit then matrixes them together, amplifies the 3 pulses and send it back to the jungle IC.

Using a scope with delayed sweep or set at the vertical rate and expended 10X you should be able to see the 3 pulses at the IK output from the CRT board and note that the amplitude will grow or shrink depending on the screen setting.

If one color is missing then you have an amp circuit problem for that color.

If none of the pulses are there and they go in from the jungle IC then look for a bad IK amp transistor.

If the pulses are there but do not vary with changing screen voltage the feed-back to the jungle IC or the IC itself is bad Some times the jungle IC has small Mylar caps off of it and if there they have been known to short. Sometimes the caps are built into the jungle IC and can still short.

Many times the IK circuit just goes out of tolerance meaning the current drawn by one crt is no longer within acceptable range and **the picture is blanked. If this is the case then increasing the screen voltage will solve, for a while, the complaint.**

Daniel Mundy, CET®/CSM
HiFi Buys a Tweeters Etc. Company
Atlanta, GA 30331

See The Next Three Pages
To Bypass This Circuit
For Test Purposes

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Opinions stated are those of the author and not the Nesda of Ohio Newsletter. Opinions stated are believed to be true, and are offered in the spirit of helping other servicers but may have no basis in fact.

Sony IK Circuit Bypass

By Joe Sopko, CET
Contributed By Jorge Miret And Luis Alberto Tamiet

Sony television sets of recent years (1994-95 & more) contain circuits which monitor the current of the CRT cathodes. The microprocessor in combination with the "jungle" chip and a series of transistors and other components in the circuits corresponding to the three cathodes, then automatically adjust the bias of each individual gun to compensate for Kinescope aging.

Unfortunately for the owner, they also will blank the picture when the Kine slumps too low. Some tech's have been able to "Rejuvinate" the Kine & restore performance, while others have wondered if there was a way to bypass that IK circuit. That answer has been always been "NO" --- Until now.

Jorge Miret, of J.C.Electronic Repairs in Puerto Rico has discovered a circuit modification which will allow a bypass of that circuit. It is found on a Spanish-Language website **www.comunidadelectronicos.com/articulos/IK.htm** which makes it a bit tough on us Gringo's, but "not to worry". Google, the ever helpful search engine is capable of translating, as you've learned in another article published within the pages of "The Speaker".

Following is a machine-translation of that webpage, aided by your reporter where necessary.

A diagram of the circuit modification is provided. It involves cutting a trace and the addition of 3 diodes.

Translation for Gringo's:

Following is a brief description of the Operation of the IK circuit. From each output of the Jungle Chip (R, G, B) exits a pulse, three pulses in all, one to cathode of the Kine. These pulses are at the horizontal sweep rate, so that it activates during the exploration of a line. These lines are not visible in the screen, since they are sent during the beginning of the "vertical sweeping", in the area of "blanking", but they can be seen in the overscanned part of the screen if the vertical height (VSIZ) in the Menu is reduced slightly. This circuit, besides to verify the correct operation of the CRT, allows to make automatic adjustments within the IC jungle, to compensate the small differences of emission between the cathodes and to maintain the correct color of the image. The current of the cathodes is detected by 3 Detector circuits put in between the exciting amplifiers and each one of the cathodes. These circuits, send a signal, proportional to the current of each one of the cathodes, to a IK Buffer circuit, from where they are sent to the jungle chip. In many equipment these circuits are formed by discrete components (transistors, diodes, resistance, etc.) but in more recent models, all the exciting stage of the CRT and the components of IK circuit are included in a single integrated circuit like the TDA6108. Almost from the moment at which the equipment is ignited, the "jungle" chip sends the respective pulses to each one of the output pins, while it maintains a "cut" or "muting" of video (black screen). As the cathodes reach the temperature necessary to emit electrons, the current of such, generates in the respective detector circuits, a pulse similar to the applied one and whose amplitude is proportional to the current of the cathode. To see the image on the screen, When the pulses in the IK circuit reach certain amplitude, the "cut" of video is deactivated and the image appears. The lack of video (black screen), in these TV Sony, sometimes causes confusion between the technicians, because when not having an output of signal from the jungle chip, tend to suppose that the problem is in the Jungle Chip.

When faced the repair of a recent TV that presents absence of Video (black screen), we must make the following steps: To increase G2 screen voltage. If the screen is illuminated with "raster" (swept) normal, we can discard the possible problems in the circuits of sweeping. (a defect in the Vertical circuit, can cause the same symptom) This also allows us to quickly verify the necessary voltages for the operation of the CRT (filament, anode, G2). If these voltages are correct, is very possible that the problem is in the Kine drive amplifiers, in the CRT, or in the IK circuit.

The next step, is to verify the state of the CRT. If it has low emission in some of the cathodes, or if it has some internal short it can cause that IK circuit to stay in "cut". For this it is advisable to use a Kine Checker. If it is not had one, the following verification can be made: With the TV operating, momentarily place a 15 or 20K 2W resistor, between ground and each one of the cathodes (KR, KG and KB), one at a time. This will result in the corresponding color illuminating brightly. The intensity must be similar when doing the test in the three cathodes. If some of the colors does not appear or it does in tenuous form, it indicated an exhausted or defective CRT. (This is not a very precise test. It is better to use a Kine Checker, but nevertheless, this test could aid to determine if some of the guns, is defective or with very low emission).

To deactivate or "to deceive" the IK circuit sometimes can be useful. The circuit modification below will "deceive" the IK circuit into deactivating the video blockade that it causes. This can be done by disconnecting the line of the IK buffer and placing three diodes of the type 1N4148 between the pins of the integrated jungle, as it is shown in the figure. With this modification, the pulses from the output of the jungle chip are re-introduced into the IK line of the chip which then deactivates the video blockade, allowing the image to appear on the screen. If the image does NOT appear, and having made the verifications given earlier, is possible that the integrated jungle (or some component associate) is defective.

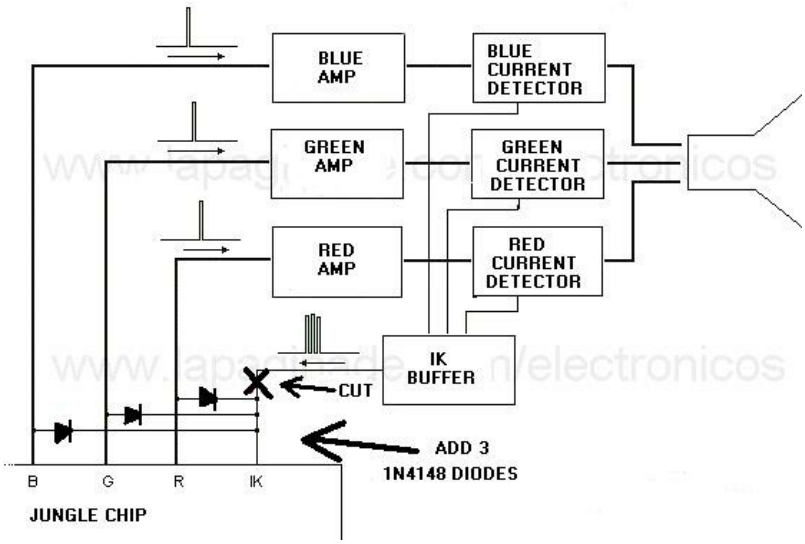
Granted, The translation leaves a bit to be desired (you should have tried reading it before I "Helped" it along). I make no claim to be a linguist— My parents never even spoke Hungarian around me, but I believe that this is more information than we've ever seen about this IK circuit before.

(Cont. Next Page)

The article that you've just read was contributed By Jorge Miret and appears to be written by Luis Alberto Tamiet on the website listed in the first paragraph. As the entire site is in Spanish, I am not sure of the actual author.

The Speaker would like to thank Both of these Techs for adding to our store of knowledge. Take the information for what it's worth, I've not tried it, and neither has the contributor so we can't speak of it's efficacy from personal experience. It is presented as another diagnostic tool to determine whether the blanking is caused by the jungle chip or the kine.

Of course, no tech would ever leave the bypass circuit in as a permanent measure, nor would "The Speaker" ever recommend a modification not authorized by the manufacturer. If you try this, we'd like to hear of your experience and opinion as to it's value.



See follow-up article next page.

Author Joe Sopko
Tried This Procedure

Sony IK bypass, IT WORKS !!

By: Joe Sopko CET

Recently, The Speaker printed an article describing a procedure to bypass the Sony IK circuit. The procedure came from a Latin American site, and at the time of printing we didn't know of anyone who had actually tried it or if it was actually effective...Heck, it took us long enough just to translate the thing!

Subsequent to that time, a Sony KV20S20 came into Consumer Service in South Euclid Ohio with a Black Screen (has sound). Turning up the Screen Grid restored the picture, so it looked as though this was a candidate to determine the efficacy of that Bypass Mod. Seized by the curiosity that marks all technicians, I installed the components mentioned in that article from The Speaker.

As you can see in Figure 1, there are 3 diodes riding like an outrigger on the Jungle Chip (CXA1870). Those 3 diodes and a cut of a foil trace on the PCB are all that the mod involves. Real Easy, Takes only a couple of minutes. Figure 2 shows how the diodes are connected schematically.

Be aware that there are different jungle chips involved in different sony chassis. Some use the CXA1465, and some use the CXA1870 (and I have no doubt that there are others, too). I have put the affected pin numbers for these 2 chips in figure 2 for your information. Also be aware that a particular chassis may use "either" of 2 chips. The chassis that I was working with had the PCB roadmapped for a 48 pin chip, but actually had a 42 pin chip installed. Needless to say, the pin markings on the PCB's surface were incorrect. (Tech's are nothing if not adaptable)

I'm glad to report that the modification performs as promised. BEFORE the Mod, the picture would blank at the low end of the screen control, would reappear at mid to high range, and then blank again at very high position of the control. AFTER the Mod, The picture was present throughout the entire rotation of the screen control. I assume that Sony's intent was to prevent a poor picture from being seen as the kine aged beyond limits. With this modification, you can watch a crappy picture throughout the entire range of the control if you so desire.

Naturally, this procedure is presented only as a Test procedure to determine if the IK Blanking Circuit is indeed keeping the picture from appearing. No technician would ever leave the mod in as a permanent fix and The Speaker would never recommend any procedure contrary to the manufacturer's approved practices.

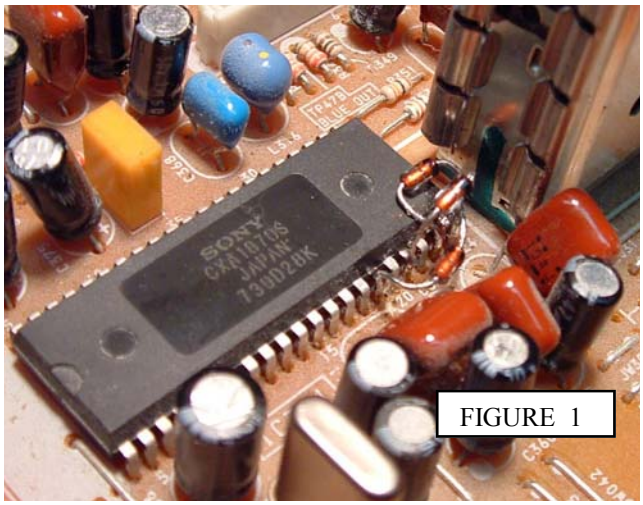


FIGURE 1

Photo by Flash Sopko with the new NesdaOhio Digital Camera

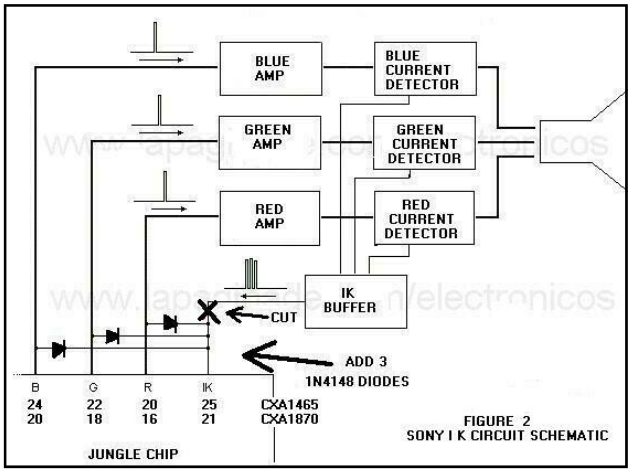


FIGURE 2
SONY I K CIRCUIT SCHEMATIC

SONY®

Training Manual

WEGA™ Direct View Television

AA-2W Chassis

Models: KV27FV15 KV32FV15
KV36FV15 KV32FS10
KV36FS10 KV32XBR250
KV36XBR250

Circuit Description and Troubleshooting

Course: CTV-26

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Circuit Description and Troubleshooting:

Model: KV27FV15 KV32FV15
KV32FV15 KV36FV15
KV32FS10 KV36FS10
KV32XBR250
KV36XBR250

Prepared by: National Training Department
Sony Service Company
A Division of Sony Electronics Inc.

Course presented by _____

Date _____

Student Name _____

SONY

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Park Ridge, New Jersey 07656

CTV261299

Printed in U.S.A.

Table of Contents

Features 1

Board Descriptions 2

Picture Tube Defect Symptoms 3

V Chip 5

Introduction 5

What is V Chip Technology? 5

Parental Guideline Rating System 5

Parental Control Menu 6

Decoding 6

Power Supply Block 7

Standby Power Supply 9

Converter Operation 9

Regulation 9

Power On/Degaussing 13

Power On 13

Degaussing 13

Converter 15

Initial Start Up 15

Soft Start 15

Regulation 15

Troubleshooting 17

Soft Start/Regulation/Foldback 19

Soft Start 19

Regulation 19

Foldback 19

Secondary Voltages 21

+135 Volts 21

+12 Volts 21

+9 Volts 21

+5 Volts 21

Audio B+ 21

Power Supply Protection 25

+135 Over Current Protection 25

Foldback 25

Vertical Deflection 27

Horizontal Deflection Block 31

Horizontal Out 33

Pincushion 35

H Protect 37

Appendix - Service Bulletins i

Features

Introduction

This course covers AA2W chassis Sony direct view televisions. These sets are part of the WEGA line which contain the flat screen FD Trinitron picture tubes. This course describes the Power Supply, Deflection and Protection circuits with a twist of practical troubleshooting tips and known solutions. In addition, this course reviews picture tube diagnostics and solutions, plus the latest information on the V-Chip.

The US models listed below use the AA2W chassis design.

KV27FV15
KV32FV15
KV36FV15
KV32FS10
KV36FS10
KV32XBR250
KV36XBR250

The following is a list of features that all of these models have.

FD Trinitronfi Picture Tube	Trinitone Color Temperature Adjustment
Dynamic Picture Processor	Velocity Modulation
Dynamic Focus Circuitry	MTS Stereo TV Decoder3
Customer Tilt Correction	dbxfi Noise Reduction
Auto Pedestal Clamp	DAC Speaker System
Magnetic Quadra Pole Focus	SRS 3D Audio Effect
V-Chip Parental Control	1Front/2Rear A/V Inputs
Program Palette Presets	CaptionVision (CC)/ XDS (Extended Data Service)
Vertical Aperture Compensation	Steady Sound With BBE

The table below shows which features are different between models.

	KV27FV15	KV32/36FV15	KV32/36FS10	KV32/36XBR250
Audio Power	15Wx2	15Wx2	10Wx2	15Wx2
2 Tuner PIP	Yes	Yes	No	Yes
Component Video Input	N/A*	1	1	1
Remote Infrared Headphones	N/A	N/A	N/A	Yes
Comb Filter	3 line	3 line	3 line	3D
S-Link	Yes	Yes	No	Yes

*One significant difference between the 27FV15 model and the rest of the models is the lack of the component input. This model will have a much simpler video path because of this.

3D Digital Comb Filter analyzes the picture along the three dimensions of height, width and time, to minimize even subtle picture artifacts.

3-Line Digital Comb Filter analyzes three TV scanning lines at a time for better color.

Vertical Aperture Compensation sharpens picture definition and edge detail on the vertical plane producing sharp horizontal edges.

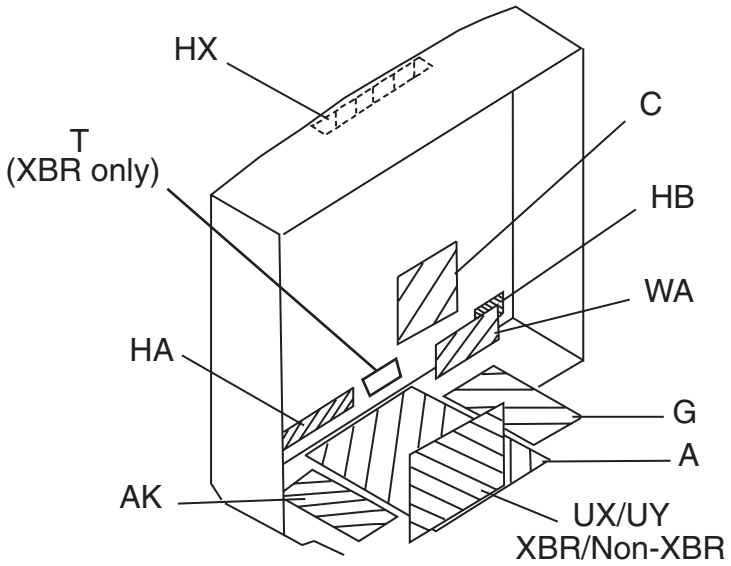
Steady Sound™ Automatic Volume Control with BBE equalizes the volume levels so there is consistency between programs and commercials.

Auto SRS® Sound Enhancement creates a vivid stereo image using the principles of human hearing to make the sound appear to come from widely separated speakers.

Magnetic Quadra Pole reduces beam spot distortion and improves corner-to-corner focus, as well as picture sharpness.

Board Descriptions

Name	Description
A	Micon, Y/C Jungle, Tuner, Pincushion, H Deflection, V Deflection, H Deflection, Syston
AK	Audio Amp, Surround Sound, Sub tuner, S-Link
C	RGB Drive
G	Power Supply
HA	Front A/V Inputs, Menu Buttons
HB	IR Detector
HX	Buttons
T (XBR Only)	IR Headphones
UX (XBR Only)	3D Comb Filter, A/V Switch, Audio Control, SRS, Chroma Decode, PIP Encode
UY (All Except XBR)	3 Line Comb Filter, A/V Switch, Audio Control, SRS, Chroma Decode, PIP Encode (except FS10 model)
WA	Velocity Modulation, Quadrapole



CIRCUIT BOARDS LOCATION

Picture Tube Defect Symptoms

Overview

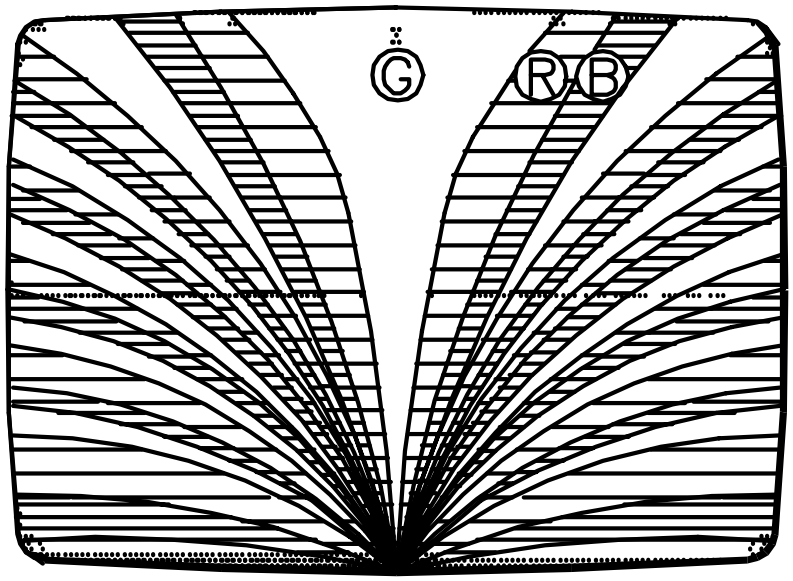
Below is an excerpt from the CTV-25 course. It shows several picture tube defect symptoms, some of which can be repaired without changing the tube.

Defective Picture Tube Symptoms			
Symptom	Suspect	Check	Procedure
Dark picture or one color missing.	Heaters Open	Apply 6Vdc to the heater terminals. Some heaters are connected in parallel, others in series but all take 6Vdc.	Clean the CRT pins and examine the socket for corrosion. Apply 6Vdc to the CRT heater pins, looking for a glow in all three heaters. Then if a heater(s) does not glow, replace the picture tube.
Dark picture	Grid 1 to Grid 2 short.	There should be infinite resistance between the G1 and G2 pins.	1. Unplug TV and remove C board. 2. Apply 15-20Vdc between the G1 and G2 pins to vaporize the short. Current limit the power supply to 1 Amp.
Bright red, green or blue picture. One color retrace lines may be present. Retrace lines are diagonal lines that run from lower left to the upper right corner.	Heater Cathode short. OR Cathode to Grid 1 short.	Remove the R, G or B video input to the CRT for the bright color. If that color is still bright, the tube is bad. There should be infinite resistance between any CRT pin to either Heater pin. *	Replace tube.
Bright picture with retrace lines and/or poor focus.	Grid 2 to high voltage Grid 3 leakage.	Symptom is that all three colors are bright.	Reduce G2 / screen voltage to the lowest setting. Vary focus control to both limits several times. Put on safety apparel. Place the tube face down and lightly tap the neck to dislodge the particle.
RGB Rainbow. (see rainbow picture)	Aperture grill was unseated in transit.	Rainbow of colors can start at the top or bottom (bottom rainbow shown).	A loose aperture grill is dangerous and may cause tube implosion. Use **all** safety precautions. Do not jar set. Transport TV face down.
Purity / Beam landing is off.	The TV s degaussing circuit did not demagnetize aperture grill metal support.	Same color blotches remain at that area of the screen regardless of picture screen changes.	**Do not manually Degauss the picture tube with a strong degaussing coil **.** Repair the TV s degaussing circuit. The thermistor or cold solder is usually at fault.

* Only the heater pins should have resistance. All other pins have infinite (∞) resistance to each other and to either heater pins.

Used picture tubes that have a heater-cathode leakage/short have a low restoration success level.

** Do not manually Degauss. New 27 35 picture tubes are magnetically conditioned for optimum beam landing. Strong manual degaussing will destroy this conditioning. Applying disc magnets (P/N = 1-452-094-00) to the bell of the picture tube is the only way to compensate for lost magnetic conditioning. The Sony manual degaussing tool can be used to degauss these tubes because of its reduced field intensity (P/N = 7-700-781-01).



RGB RAINBOW (UNREPAIRABLE)

V Chip

Introduction

"Pursuant to the Commission's rules, half of all new television models 13 inches or larger manufactured after July 1, 1999, and all sets 13 inches or larger manufactured after January 1, 2000 must have V-Chip technology. Set top boxes that allow consumers to use V-Chip technology on their existing sets are now available." This quote from the FCC web page defines the guidelines that manufacturers of television receivers must follow. No matter what your personal feelings on the ratings issue, you will be forced to deal with it as a technician. Here you will be given information on what V chip technology is, how it is implemented in Sony televisions and what to do if the customer forgets their password.

Broadcasters are not required at this time to transmit ratings for their programming. At this time, however, the major networks are broadcasting ratings but all of their affiliates are not. In addition, many of the popular cable stations are broadcasting V Chip ratings.

What is V Chip Technology?

The V Chip system allows broadcasters to send data that contains ratings. The television receiver processes this data and acts according to the programming wishes of the user. The user's television has menu options for determining which programs should be blocked. These options are compared to the data received and programs are blocked accordingly.

Parental Guideline Rating System

The ratings can be separated into three categories. They are TV Ratings, Movie Ratings and Unrated. The following table shows the ratings for the three categories.

Overview of the Ratings

TV RATINGS *Block programs by their rating, content or both*	**Age based options:** **TV-Y:** All children. **TV-Y7:** Directed to older children. **TV-G:** General Audience. **TV-PG:** Parental Guidance suggested. **TV-14:** Parents Strongly cautioned. **TV-MA:** Mature Audience only. **Content based options:** **FV:** Fantasy Violence. **D:** Suggestive Dialogue. **L:** Strong Language. **S:** Sexual situations. **V:** Violence.	TV RATINGS ▸TV-Y: _ TV-Y7: _ FV: _ TV-G: _ TV-PG: _ D_ L_ S_ V_ TV-14: _ D_ L_ S_ V_ TV-MA: _ L_ S_ V_ ⊃MENU Select category Move Select Exit
MOVIE RATINGS	(U.S. models only) **G:** All children. **TV-PG:** Directed to older children. **PG-13:** General Audience. **R:** Parental Guidance suggested **NC-17:** No one under 17 admitted. **X:** No one under 17 admitted.	MOVIE RATINGS ▸G: _ PG: _ PG-13: _ R: _ NC-17: _ X: _ ⊃MENU Select rating Move Select Exit
UNRATED *Block programs or movies that are broadcast without a rating*	(U.S. models only) **VIEW ALL:** Allows all unrated programming. **BLOCK TV:** Blocks all unrated TV programs. **BLOCK MOVIE:** Blocks all unrated movies. **BLOCK ALL:** Blocks all unrated programming.	CUSTOM MENU TV RATINGS MOVIE RATINGS ▸UNRATED: VIEW ALL ⊃MENU Select category Move Select Exit

The TV Ratings are both age and content based. The level of the content rating is also based on age. For example, a program with a TV-PG V (Violence) rating may contain moderate violence, while a TV-14 V rating may contain more intense violence.

The consumer may choose to block Unrated programs. If they do this, they need to be aware that emergency broadcasts, political programs, sports, news, public service announcements, religious programs and weather programs may be blocked.

Parental Control Menu

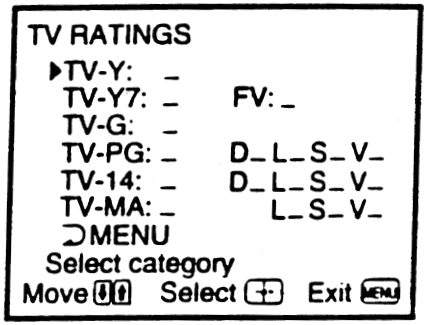
Sony V Chip equipped televisions contain the Parental Control Menu, which is located in the Setup section. When it is selected, the user will be asked for a 4-digit password. After this password is entered, the user will be asked to confirm it. After confirmation, the password is set. Anytime the user wants to modify the Parental Control Menu, the password must be entered. **Note: If the customer forgets their password, the master Password 4357 can be entered. This allows the customer to reset their password. No settings can be changed until a new password is entered.**

When you have entered the password, an options menu will be displayed. The options are as follows.

Parental Lock: This is used to enable or disable the ratings system. This is done by selecting On or Off.

Rating: There are four ratings that can be selected.

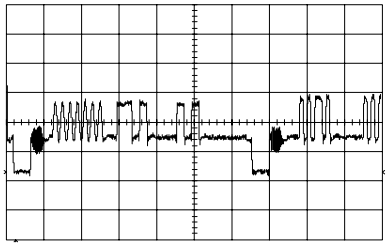
- Child – The child selection is used to enable only TV-Y, TV-Y7, TV-G and G ratings.
- Youth – The youth selection is used to enable TV-PG and PG ratings. Ratings considered lower than these will also be enabled.
- Youth Adult –Tthe youth adult selection enables TV-14 and PG-13 ratings in addition to lower ratings.
- Custom – The custom selection allows you to tailor the age and content ratings to your liking. The picture below shows the menu that will be seen when custom is selected.



Here the user can select ratings by age or content. If they do not want violence of any kind to be seen but are not offended by strong language, they can select the V for PG-14. This will block all V settings above PG-14.

Decoding

The Parental Guideline Rating that is broadcast by the programmer must be decoded at the receiver. This rating data is placed on Line 21 Field 2 or Line 284.



The preceding waveform shows the contents of Line 21 Field 2. We see that right after the burst signal on the back porch of the horizontal sync is a clock signal. This clock is used to inform the decoder that data is coming and to synchronize the decoder and data. Since there is other XDS (Extended Data Services) data on this line, the first three data bits are known as the identifier. Data 001 identifies the data as Parental Ratings data. Then two bytes of data are sent which contain the rating information. The first byte contains information about the age rating and the second contains information about the content rating.

Ratings are decoded by the System Control IC in Sony televisions. These ICs contain the programmed information and the decoder. When a program is determined to have a rating that should be blocked, this is recognized. The System Control IC also contains the OSD outputs. When the program is to be blocked, the OSD section outputs a black screen along with the blocked show's rating. For example, if the Parental Controls are set to Child and the received program is rated TV-14, the screen will be black with TV Rating TV 14 in white letters.

There is also an additional V-Chip IC used on sub-tuner video. This prevents blocked programs from being displayed in the PIP window.

Power Supply Block

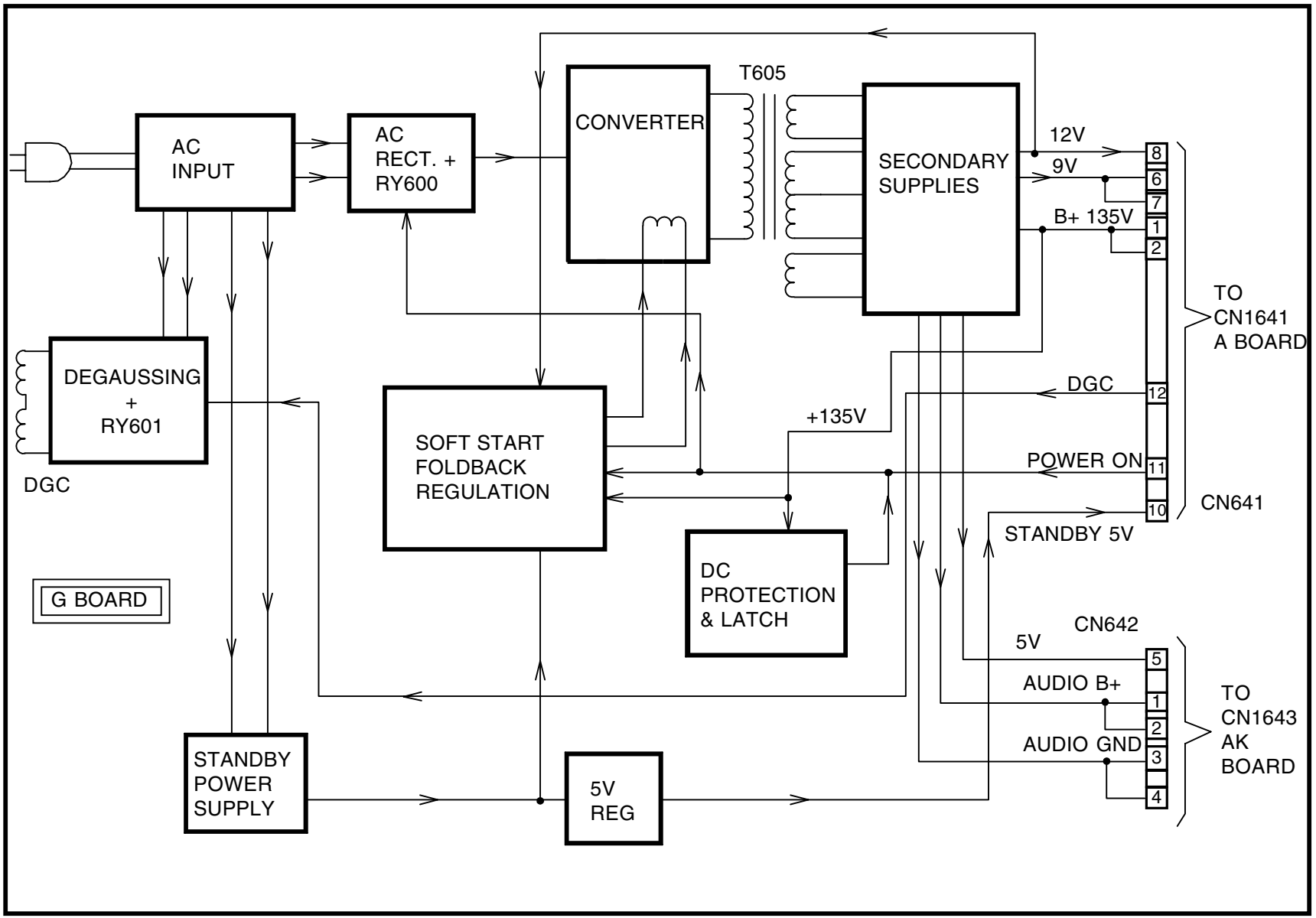
Overview

The power supply in the AA2W chassis is located on the G board. AC from the outlet is applied to a series of line filters and protection devices and eventually applied to the standby supply, AC rectifier and degauss circuits. The Standby supply is a switching supply whose output is applied to a 5-volt regulator. The output from the regulator exits the G board at CN641/10. It is applied to various components in the set that need to be powered when the set is OFF. These include the Micon and the remote sensor.

When the set is turned ON by using either the power button or the remote control, 5 volts is applied to CN641/11. This 5 volts is used to turn RY600 Power Relay ON. When the relay closes, a click is heard. Closing the relay allows the rectified ac voltage to be applied to the converter circuit. The converter begins operation when this voltage is applied. The power ON line is also applied to the soft start circuit. The soft start circuit holds the B+ voltage low while the power supply filters charge by controlling the voltage present across the control winding. The control winding determines the switching frequency of the converter. After soft start operation is complete, the regulation circuit takes over operation of the control winding. This allows the converter's output to be coupled through T605 to the secondary supplies. These supplies supply power to the rest of the set. The regulation circuit monitors the +135 volt line.

Shortly after the click of the power relay at turn ON, another click is heard. This click is RY601 Degauss Relay closing. This may be accompanied by a hum sound that indicates the operation of the degaussing coils. After the AKB circuit operation is considered normal, the degaussing relay opens. This is the third click that occurs about 8-10 seconds after the unit is turned ON.

During operation of the set, the +135 volt line is monitored for DC protection. This protection circuit is used in conjunction with the latch to switch the Power ON line LOW if a failure should occur. This will turn RY600 Power Relay OFF and turn the power supply OFF. In addition to this protection circuit a foldback circuit can also shut down the power supply. The foldback circuit compares the secondary's +12 volt output to a voltage on the primary side. If there is a problem with either one of these circuits, the set will shut down.



POWER SUPPLY BLOCK

7CTV26 1/1/00

Standby Power Supply

Overview

The standby power supply is a switching power supply used to create Standby 5V. The Standby 5V line is used to power the Tuning Micon and EEPROM and any other circuits which need power when the set is OFF.

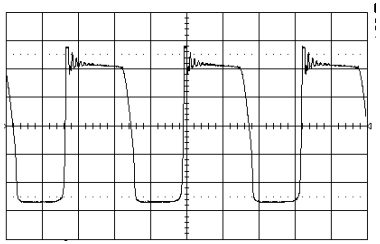
Converter Operation

Operation of the Standby power supply begins when the set is plugged in. The AC line voltage is applied across the standby power supply. The AC low side is ground for this circuit. The AC high side is applied to a half wave rectifier consisting of D621 and D622. Two diodes are used so that there will be protection should one of them fail. This voltage is then applied to T621/1 SRT Input through R639. R639 is a fusible resistor used for current limiting and failure protection. It will open if the standby switching circuit draws excessive current. Please note that the board has T621 SBT silk-screened on it. This differs from the service manual, which calls T621 SRT.

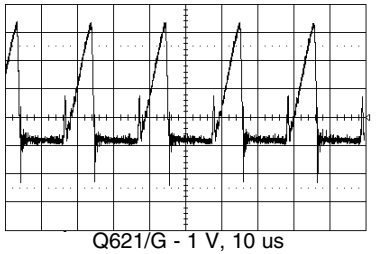
When the voltage is applied to T621/1 SRT Input, current flows through the winding and R631 to Q621/G. Q621 Converter is a FET with added protection. When a positive voltage is applied to the gate, it begins to conduct drain to source. This reduces the voltage at T621/3 to close to zero. Normally this would reduce the voltage at Q621/G, but a voltage is supplied to the gate through R632 and C630 from T621/4. This voltage is induced into the secondary winding of T621/4 when current flows through the winding between T621/1 and T621/3. The voltage is not permanent due to C630. As C630 charges, it reduces the voltage at Q621/G. Once this voltage falls below a certain threshold, Q621 Converter turns OFF.

Once Q621 Converter turns OFF, all polarities are reversed. This reversal of polarity helps speed up turn OFF of Q621. D623, along with C631 and R640, form a snubber network (voltage clamp). This network clamps excessive voltage overshoot caused by the collapsing magnetic field of T621 SRT and returns the excessive voltage to C629. When the field collapses fully, current begins to flow through T621/1 and 3.

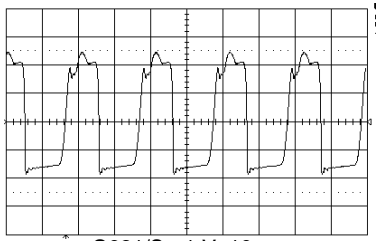
The waveforms below show what will be seen at Q621.



Q621/D - 50 mv, 10 us



Q621/G - 1 V, 10 us

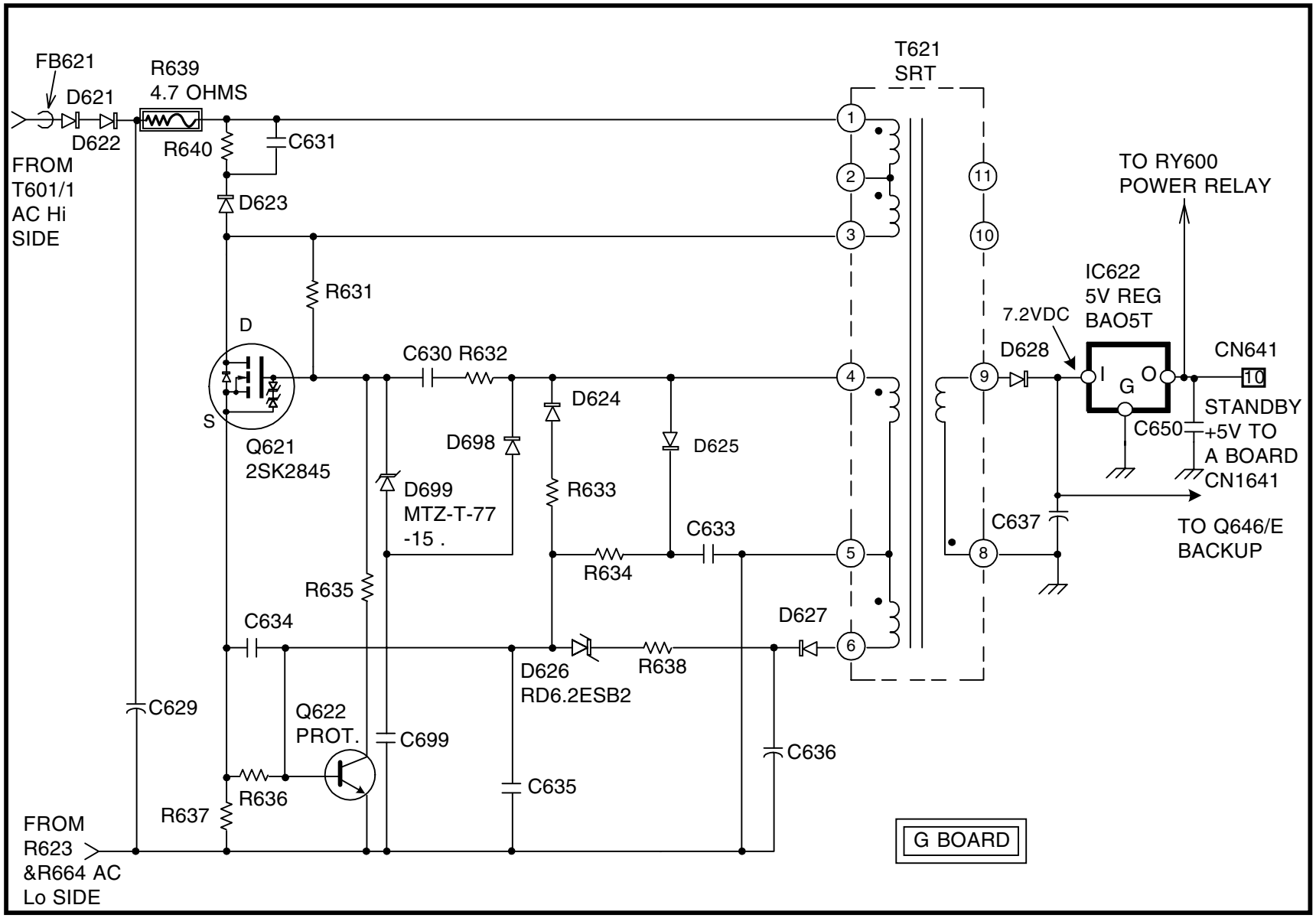


Q621/S - 1 V, 10 us

Regulation

Changing the frequency of the switching regulates the output voltage at the secondary winding comprised of T621/8 and 9. Taking a sample voltage from T621/4 and applying it to rectifiers D624 and D625 does this. As this voltage rises and falls, the rectified voltage is applied to Q622/B through R634. When Q622 begins to conduct, it lowers the voltage at Q621/G and changes the switching frequency.

The changing frequency will change the amount of voltage coupled to the secondary winding consisting of T621/8 and 9. If the load on the secondary output increases, the frequency of switching will decrease. This brings the frequency of the converter closer to the optimum operating frequency of T621 SRT. Moving closer to this optimum frequency causes more voltage to be provided at T621/9. The opposite occurs when the load on the supply decreases. This causes the frequency of operation to be increased and the amount of voltage coupled to T621/9 to be decreased. The supply typically operates at 45 kHz when the set is OFF and at about 30 kHz when the set is operating. The incoming line voltage also effects the frequency of switching operation.



STANDBY SUPPLY

3 CTV26 1187 12/28/99

Over Current Protection (OCP)

Monitoring the voltage across R637 is used for over current protection. This voltage is representative of the amount of current flowing through Q621 Converter since it is in series with the transistor. If this voltage should rise to .6 volts, it will cause Q622 to turn ON. If Q622 were to turn ON, it would shunt Q621/G voltage to ground. This would cause Q621 Converter to stop conducting.

Over Voltage Protection (OVP)

Over voltage protection is done by rectifying the voltage at T621/6 with D627. This voltage is filtered by C636 and applied to D626 through R638. If this voltage should rise above 6.2 volts, D626 begins to conduct. When its conduction allows Q622 Protect to turn ON, over voltage protection is employed. Q622 Protect turns ON and grounds Q621/G, which stops the converter from switching.

D699 is also used for OVP. The signal from T621/4 is rectified by D698. This creates a negative voltage across C699. If this negative voltage becomes great enough, D699 conducts and the Q621/G voltage is brought lower.

Secondary Output

The power coupled through T621 SRT places a voltage on T621/9 that, when rectified and filtered by D628 and C637, is 7.2 volts. This voltage is constant due to the regulation circuit on the primary side of T621 SRT. This 7.2 volts is applied to Q646/E for backup during the start of regulation by the regular power supply.

It is also applied to IC622 5-Volt Regulator, which regulates its output to 5 volts. This 5 volts is sent to CN641/10 which connects to the A board and powers the Tuning Micon and other circuits. It is also applied to RY600 Power Relay.

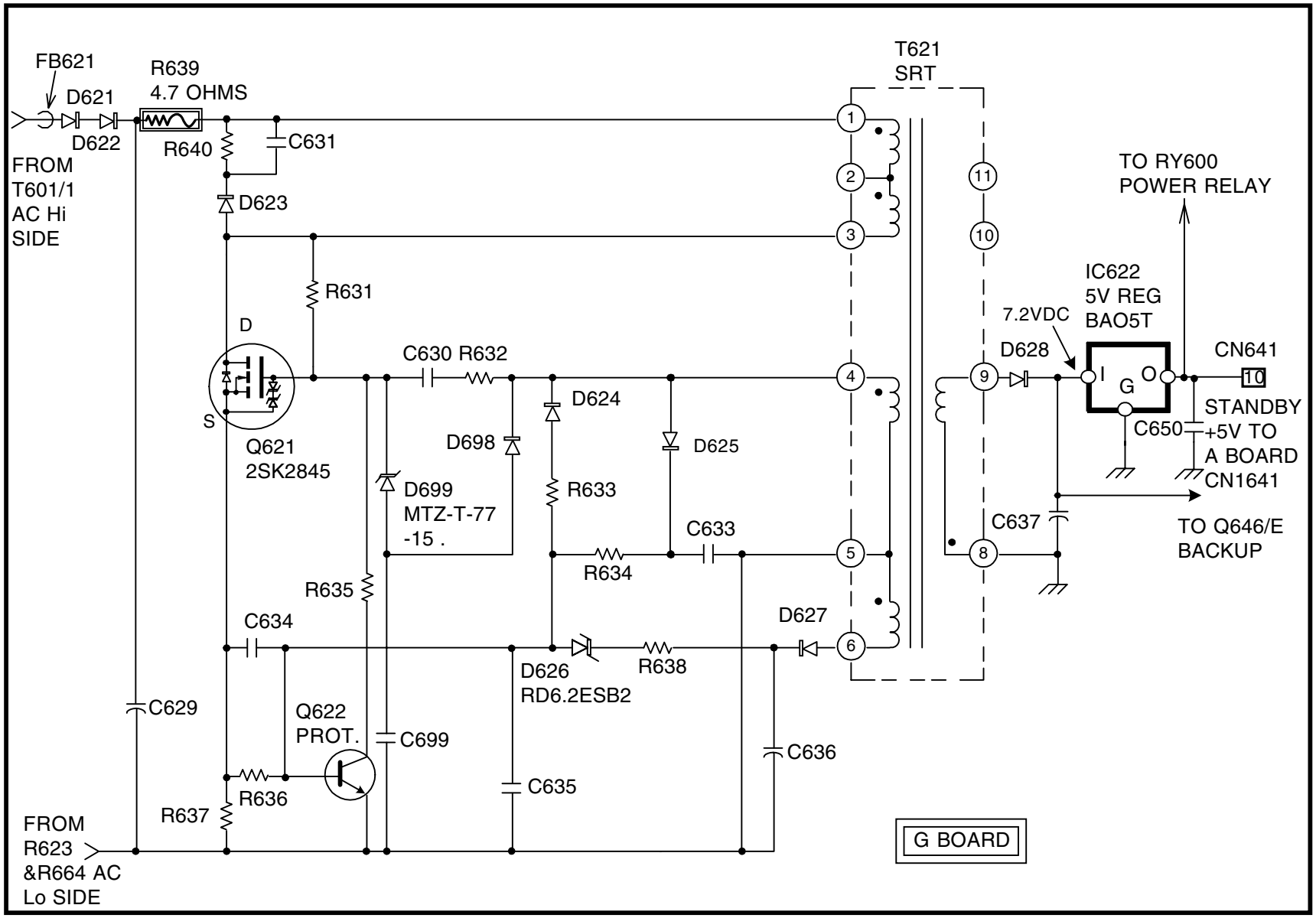
Checking Q621

Testing a MOSFET device is simple. The leads show infinite resistance to each other except for drain to source in one direction because of the presence of a protection diode.

To prove the device is functional:

1. Connect the negative lead of the ohmmeter to the SOURCE lead.
2. Touch the ohmmeter positive lead to the gate, to pre-charge it.
3. Connect the ohmmeter positive lead to the DRAIN. If the device is good you will get a resistance reading of about 400-1k ohms.

Some DVMs do not produce enough DC voltage in the ohms mode. The diode check mode can be used with these models. When using the diode mode, a low voltage drop is shown after pre-charging the gate.



STANDBY SUPPLY

3 CTV26 1187 12/28/99

Power On/Degaussing

Overview

This section discusses how the converter B+ voltage is created when the set is turned ON. When the set is turned ON, the degaussing circuit is activated.

Power On

When the set is plugged in, the AC voltage is applied through F601, T601 and T602. Additional components C605, VDR601, C604 and VDR602 are across the AC line input. They are in place for protection from AC line spikes and surges. This AC voltage is applied to the standby power supply and will be applied to D602 Bridge Rectifier when RY600 Power Relay is closed. R623 and R664 will limit the current when the relay is initially closed.

When the customer turns the set ON using either the remote or the power switch, a 5-volt signal is output from IC001/62 Tuning Micon O-Relay. This HIGH is sent to the G board via the wiring harness between CN1641 on A board and CN641 on the G board.

This signal is used to turn Q648 ON. When Q648 turns ON, it places a LOW at its collector. This causes RY600 to energize, closing the contact and allowing current to flow to D602 Bridge Rectifier. The LOW from Q648/C is also applied to the Q646 Backup and Q647 Soft Start transistors.

Voltage Doubler

D602 Bridge Rectifier is used with C606, C607, D629 and D630 to form a voltage doubler. Therefore, the output of the voltage doubler is approximately 310 VDC. This voltage will be referred to as Converter B+. Converter B+ is applied to the converter circuit through R607. R607 is a fusible resistor. If the converter circuit draws too much current, it will open. When RY600 Power Relay is closed, a click is heard. When the Converter B+ is applied to the converter circuit, it will begin to operate and supply power to the rest of the set.

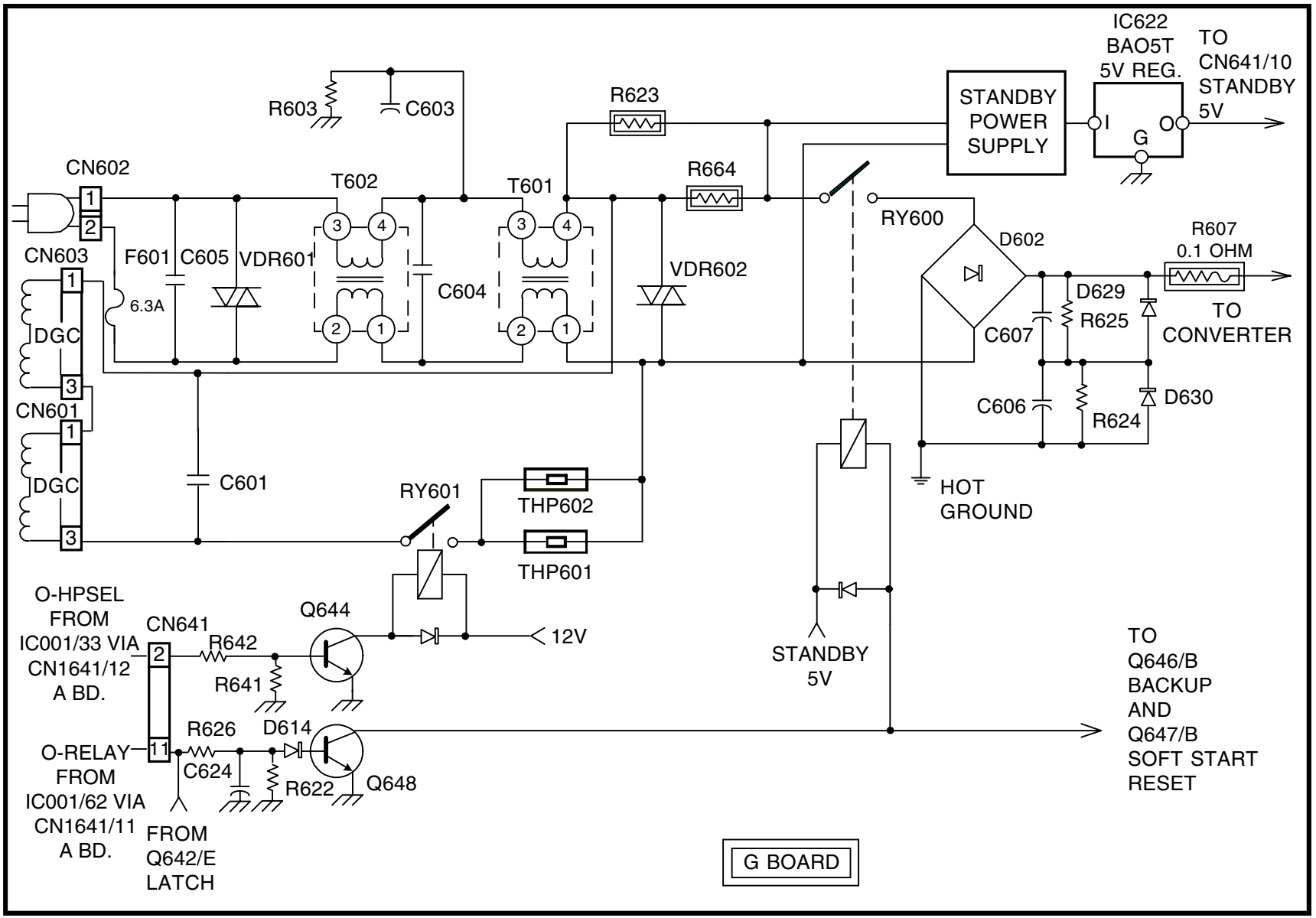
Degaussing

When the set is turned ON, a click is heard from the Power Relay RY600. About one second later another click is heard from RY601 Degauss Relay. After this a loud hum can be heard. This indicates that the degaussing circuit is operating. The degaussing circuit operates because every time the set is turned ON, a HIGH is output from IC001/33 Tuning Micon O-HP SEL. This HIGH is applied via the cable between CN1641 on the A board and CN641 on the G board. This voltage is used to turn ON Q644. When Q644 is turned ON, RY601 is energized, causing current to flow from the AC line through THP601 and THP602. When current flows, 120VAC is applied to the degaussing coils. When this occurs, a hum can be heard.

THP601 and THP602 are thermistors whose resistance increases as they get warmer. The thermistors should read less than 10 ohms when cold. The current flowing through them when voltage is applied to the degaussing coils is great and causes the thermistors to open after a few seconds. This stops the action of the degaussing coils since no more current is flowing through them. The set will not degauss properly if the set is turned OFF and ON again quickly. You typically need to wait at least a few minutes until the thermistors have cooled to degauss again.

If the degaussing circuit is not operating, no hum will be heard when the set is turned ON. It is also likely that purity problems will occur since the tube could become magnetized.

Room vibrations may cause the contacts of RY601 to make contact when they are not supposed to, causing the degauss coils to be activated while the set is producing a picture. If this occurs, the customer may complain about an intermittent rainbow pattern or intermittent loss of purity. If a customer complains about this, try replacing RY601.



POWER ON/DEGAUSSING

4CTV26 1188 12/28/99

Converter

Overview

The function of the converter is to switch the Converter B+ voltage through a transformer's primary winding. This switching will produce a signal that will be coupled to the transformers secondary windings where they are rectified and used to supply various voltages to the set. The frequency of this switching is controlled to maintain a consistent value on the +135 volt line. Changing the frequency of the switching can be used for regulation due to the efficiency characteristics of the transformer. A second transformer with a cross-inductance winding is used to create a "dual tank oscillator". The voltage across the cross-inductance winding or control winding is used to change the value of the inductance in the tank circuit and consequently change the frequency of switching.

Initial Start Up

When RY600 Power Relay (not shown) is closed, 300 VDC is developed and applied to R607. Converter B+ is then applied to C613 and C615. C613 ensures that the bottom transistor IC601-1 turns ON initially. When IC601-1 turns ON, there is a current path through C615, T605/1 and 2, T603/1 and 2, through IC601-1/ C-E to ground. The voltage applied to IC601-1/B by T603/4 sustains this current path. This voltage at T603/4 is developed by the expanding magnetic field being produced by the current flowing through T603/1 and 2. When the magnetic field in T603 PRT stops expanding, IC601-1 turns OFF. When this occurs, a voltage is induced by the collapsing magnetic field at T603/3 that turns IC601-2 ON. This provides a discharge path for C615. When C609 is fully charged, IC601-2 will turn OFF. This cycle will continue to repeat itself. As the voltage across T604/7 and 8 Control Winding changes, the inductance of the other windings will change. This will determine the frequency of switching.

Soft Start

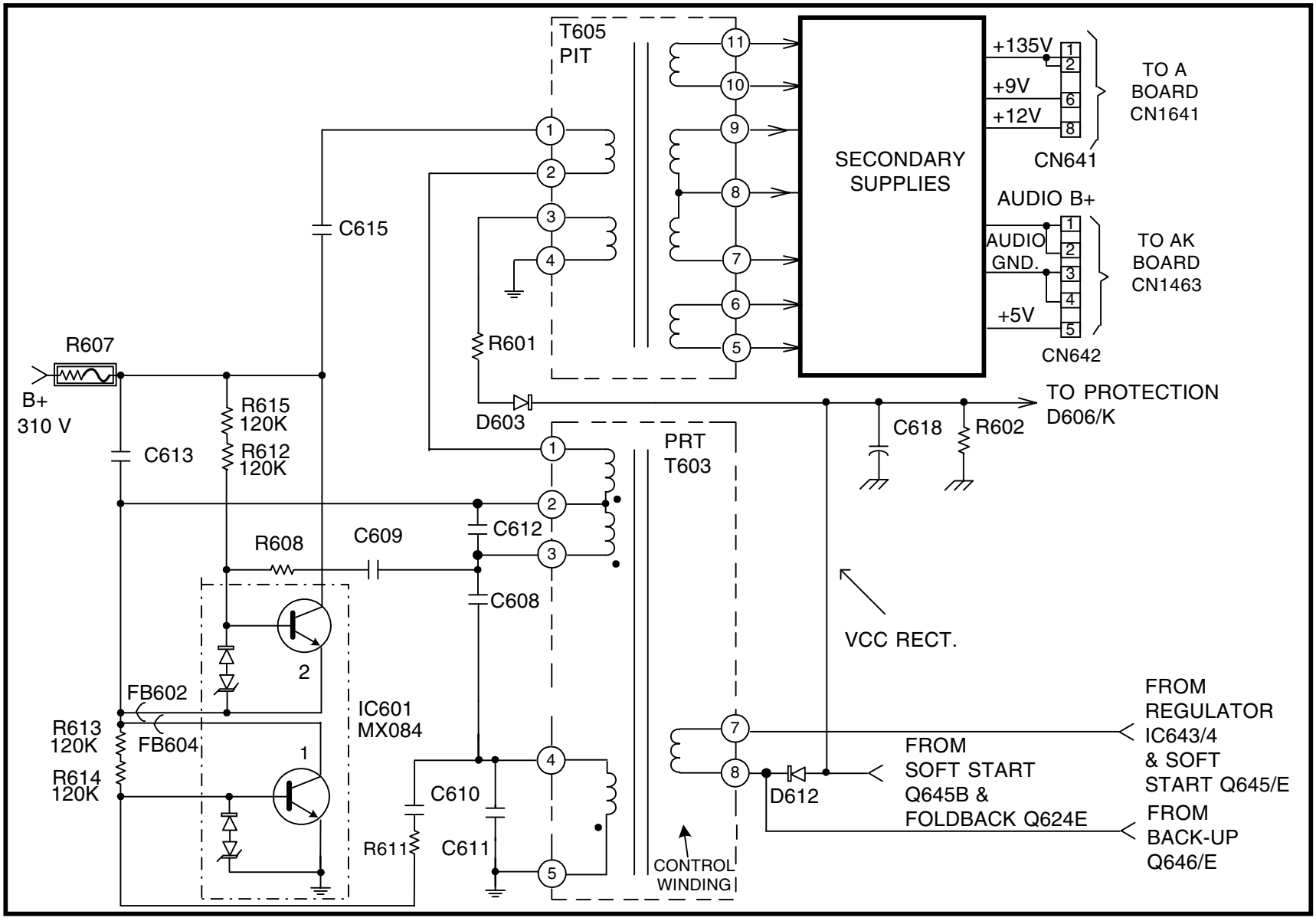
The voltage across T604/7 and 8 Control Winding determines the frequency of operation. The control winding is a cross inductance winding. At initial startup the converter has to switch above the optimum frequency of T605 PIT. A soft start circuit is used to ensure that this occurs. The soft start circuit will ensure that a voltage of approximately 7 volts will be applied across T603/7 and 8 Control Winding. After the converter begins to run, the voltage from the Vcc Rect. line is applied to T603/8 through D612. The voltage applied to T603/7 will then come from the regulator circuit instead of soft start.

Regulation

The frequency of the power supply is dependent on the load that it sees. When the picture brightness increases, the load increases, lowering the voltage across T603/7 and 8. When this occurs, the frequency of the oscillator decreases, allowing T605 to supply more current to the secondary windings. This keeps the 135V line from lowering in voltage.

The following table shows what occurs with different loads on the supply. Note that the oscillator frequency changed, but the 135V line remained within a few tenths of a volt of its value. You should also be aware that the frequency of operation is also dependent on the input AC line voltage.

Location	White Raster	No Input
V across pins 7 and 8/T603	2.18 VDC	2.38 VDC
Freq. at IC601/E2	62 kHz	66 kHz
V at CN641/1	135.3 VDC	135.6 VDC



CONVERTER

2CTV26 1186 3/22/00

Troubleshooting

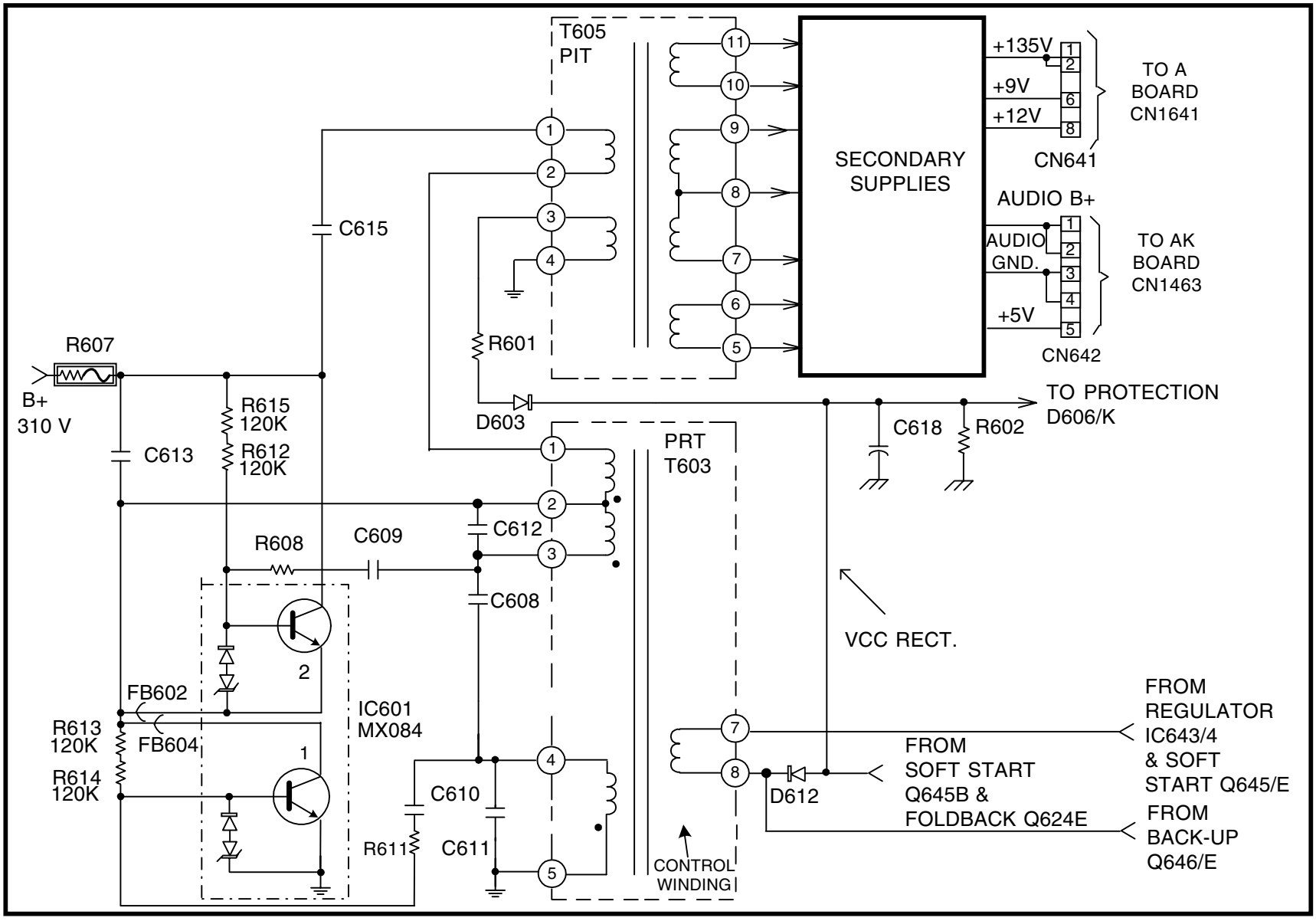
One of the most common failures in switching power supplies are the converter transistors or in the case of this power supply, IC601. IC601 actually contains two identical transistors. They are assembled in this package so that their gain and other characteristics are closely matched. Generally when these transistors fail, they fail by shorting C-E in one or both of the transistors. This causes the fusible resistor to open due to excessive current draw. The fusible resistor in this case is R607. The symptom in this set is that you hear only one relay click on initial power up instead of three. Usually you would hear two, the power relay followed by the degaussing relay. This would be followed by another click about ten seconds later that indicates the degaussing relay is turned OFF. You can check the voltages around IC601 to troubleshoot this problem. There would be no voltages present since R607 would be open due to the shorted transistor.

You should always check the horizontal output for shorts when the converter transistor has failed. It is also a good idea to unload the power supply and bring the line voltage up slow using a variac.

When performing this procedure, set your variac to zero. Jump the relay contacts. **Warning: By jumping the relay contacts you have defeated the protection circuitry of the power supply.** Plug the unit into the variac and bring the AC voltage to 30 VAC. You should have stable oscillation at this point. Check to see how much current is being drawn from the AC line. The current drawn should be minimal since the supply is unloaded. Check the voltages at the points in the table below. The oscillator voltage and frequency are measured at T603/2. The secondary voltages can be easily checked at CN641 and CN642. Increase the line voltage by ten volts and check each item in the table again. Repeat this procedure at 50 and 60 VAC. **Warning: It is not recommended that the power supply be operated unloaded above 60VAC.**

Another problem that may occur is that the switching never starts. To troubleshoot this type of problem, remove one lead from C615. When you power the set ON, you should have a DC voltage of half the Converter B+ at T603/2. This is where the switching waveform would normally be present. If the voltage is lower at this point, suspect an open related to IC601-2 or a leaky component related to IC601-1. If the voltage is high at this point, suspect an open related to IC601-1 or a leaky component related to IC601-2.

AA2W Chassis Power Supply Output Voltages	**Fully unloaded (CN641 and CN642 unplugged)**						
	Primary (Hot Ground)		Secondary (Cold Ground)				
Variable AC Input	Oscillator Voltage	Oscillator Frequency	135	12	9	5	Audio B+
30Vac	80 Vp-p	145 kHz	48.7V	14.5V	5.0V	-3.6V	4.5V
40Vac	100 Vp-p	145 kHz	63.0V	18.5V	5.8V	-3.7V	5.8V
50Vac	130 Vp-p	147 kHz	63.2V	20.0V	6.3V	-3.8V	6.1V
60Vac	150 Vp-p	Unstable	69.0V	22.2V	6.8V	-3.8V	6.9V



CONVERTER

2CTV26 1186 3/22/00

Soft Start/Regulation/Foldback

Overview

The three circuits discussed here all have an affect on the voltages across T603/7 and 8. This winding of the PRT is a cross inductance winding or control winding that controls the frequency at which the converter operates.

Soft Start

At power ON, C602, which is discharged, has a 0V potential at its + terminal. This biases Q645 ON, via R647. With this transistor ON, it allows the standby unregulated from Q646/E to be applied across T603/7 and 8. This voltage is passed through Q646 Backup since the same line that turns RY600 Power Relay ON turns it ON. The greater the voltage across this winding, the higher the converter frequency and the lower the efficiency of T605 PIT. This is discussed in the Converter section. Therefore, the start up secondary voltages will be reduced considerably. As C602 charges, the voltage difference between T603/7 and 8 diminishes. As this voltage lowers, the secondary voltages will rise. When the Vcc Rectifier voltage is larger than the Standby unregulated voltage, D612 will begin to conduct and the Vcc Rectifier voltage will control T603/8. Also at this time C602 will be fully charged and IC643 Control IC will take control over T603/7. The difference in voltage between T603/7 and 8 will regulate the converters operating frequency.

Soft Start Reset

It is important that the soft start capacitor C602 be fully discharged when the set is turned OFF. Turning Q648 OFF when the unit is turned OFF does this. This removes the ground path from the relay, opening it up. It also allows current from the Standby +5V to flow through the relay coil, through R621, to Q647/B. This turns the Q647 ON and discharges C602 through R627.

Q646 Backup will also be turned OFF when the Power On line becomes HIGH.

Regulation

The power supply is regulated by the control winding of PRT T603/7 and 8, in the following manner:

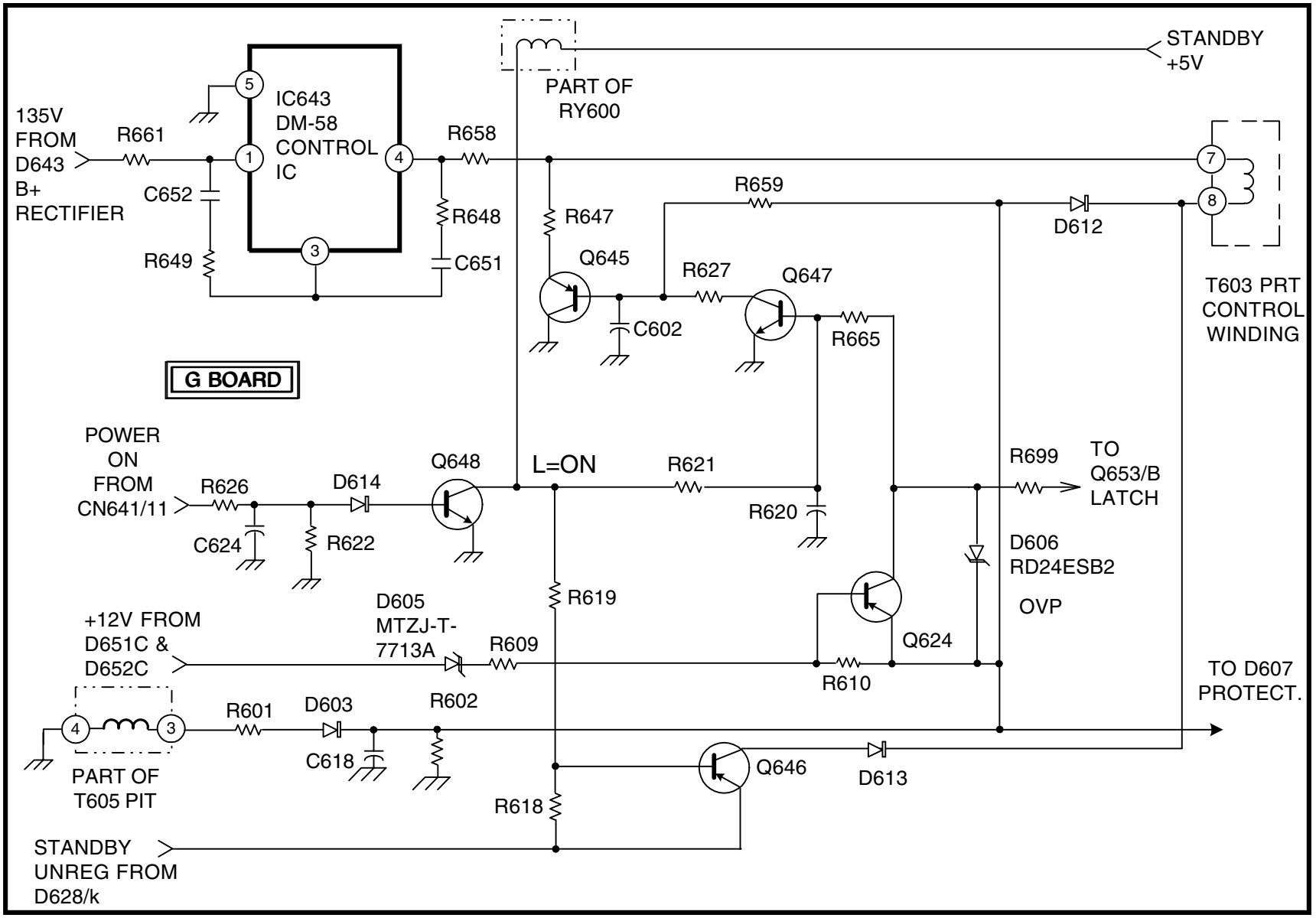
An increase in voltage across the control winding will reduce the inductance of the windings in T603, consequently increasing the converter frequency. When the converter frequency increases, it moves further away from the optimum operating frequency of T605 PIT, reducing the voltage at the secondary outputs. The opposite occurs when the voltage across pins 7 and 8 decreases. A correction voltage is produced by IC643/4, which varies inversely proportional to the 135V line. Pin 7 of the transformer control winding is connected to the correction voltage. The other leg of the control winding (pin 8) is connected to the output from D603 Vcc Rectifier. The difference in the voltage across this winding determines the frequency of the converter which regulates the +135 Volt line as described in the previous sections.

Foldback

The foldback circuit is a type of protection circuit that uses a winding on T605 PIT to monitor the current drawn by its secondary. This voltage is rectified and called Vcc Rect. Q624 is set up with the Vcc Rectifier voltage input to the emitter. Its base is connected to the Rectified +12 volt line from the secondary side of the supply through D605 and R609. D605 is a zener diode whose breakover voltage is 13 volts.

This circuit will protect against two failures. The first is a rise in the Vcc Rect. This voltage is developed by the foldback winding of T605. This winding is used as a current mirror. This means that the more current drawn on the secondary of T605 PIT, the higher the voltage at T605/3. When too much current is drawn from the secondary, Q624 would turn ON because of the increase in voltage across R610. If this occurs, the latch and soft start circuits will be activated. Soft start is activated to lower the output supply voltage by increasing the switching frequency. The latch's purpose is to shut the supply down.

Secondly, if there were a loss of the +12 volt line then D605 would breakover. This would cause sufficient current flow through R610 and Q624 would turn ON. If this occurs, the latch and soft start circuits will be activated.



SOFT START/FOLDBACK/ REGULATION

5CTV26 118 1/4/00

Secondary Voltages

+135 Volts

The signal from the winding of T605/10 and 11 is applied across D643 Bridge Rectifier and C643 and L642 filter the rectified voltage. D648 is a 150-volt zener diode that will limit the voltage to 150 volts in case of a failure that causes the B+ to rise. This voltage is then sent through R652 and output from the G board at CN641/1 and 2. The voltage is used on the G board by the protection and regulation circuits and is also used to produce the +33 volt line on the A board.

+12 Volts

D651 and D652 rectify the signal from T605/7 and 8. This voltage is filtered by C658 and input to IC650 12-Volt Regulator. IC650 outputs a regulated 12 volts that is filtered by C661 and output from the G board at CN641/8.

+9 Volts

The signal from T605/7 and 8 is applied to D642 through two similar parallel networks consisting of L650 and R670, and L651 and R670. This rectified voltage is then applied to the input of IC641 9-Volt Regulator. The output of this IC outputs 9.6 volts to L652 and also to CN641/6 and 7. The voltage is 9.6 instead of 9 because D647 is connected between the ground pin of IC641 9 Volt Regulator and ground.

+9 Volt Protection

The +9 volt line also is monitored for OCP. Using the voltage drop across R680, R681 and R644 to control the conduction of Q649 does this. When the amount of current drawn on the 9 volt line is sufficient to cause Q649 to conduct, Q650 will be turned ON. This places a LOW on the inhibit line of IC641 9 Volt Regulator. When there is a LOW present at this pin, the output of IC641 is disabled.

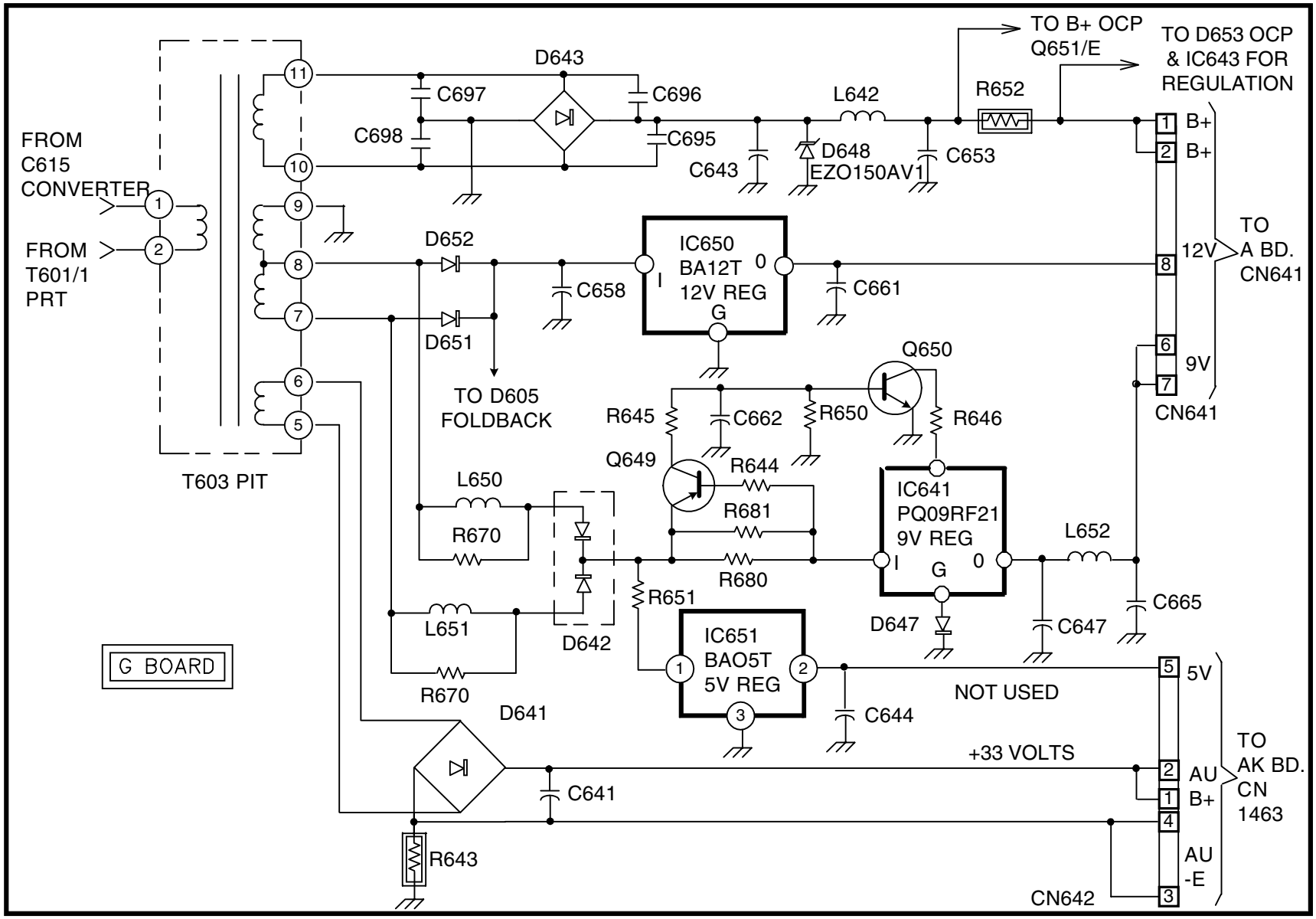
+5 Volts

The +5 volt line will not be discussed since it is not used in the set.

Audio B+

The signal from T605/5 and 6 is applied to D641 Bridge Rectifier. The negative side of D641 is connected through R643 to ground; therefore the Audio B+ floats slightly above ground level. The voltage output from D641 is filtered by C641 and then sent to CN642/1 and 2 unregulated. The audio B+ is used only by the Audio Output Amplifier IC1461 located on the AK board. One step in troubleshooting a set that is shut down is to disconnect CN642. If the set still operates, then replace IC1461 Audio Output. Be sure to discharge the voltage at CN642/1 and 2 before reattaching the connector to CN642.

Shorted Supply	Distribution
+135	A Board - T503 Flyback, H Drive Q501, H Out Q502, Pin Amp Q512, WA board VM Drive Q946
+12	A Board - Q301 HP Buffer, IC353 SHP, All WA board except VM Drive
+9	A board - TU102 Tuner, IC351 VM Mute, IC352 YUV Switch, IC354 YUV Switch, IC355 Y/C Jungle, IC101 D/A Converter, AK Board - IC1401 Audio Processor, IC1403 SRS, Q1102 Tuner 5 Volt Regulator, C Board - Q1790 IK Buffer, UY Board - IC2006 5 Volt Regulator, IC3302 5 Volt Regulator, IC3304 Chroma Decoder, IC3308 YUV Switch, UY Board IC2005 3.3 Volt Regulator, IC2006 5 Volt Regulator for tuners,
UY5 from IC2006	IC3504 Comb Filter
UY5 from IC3302	IC3307 V Chip, IC3303 PIP Processor
Audio B+ (33 volts)	AK Board - IC1461 Audio Output



SECONDARY SUPPLIES

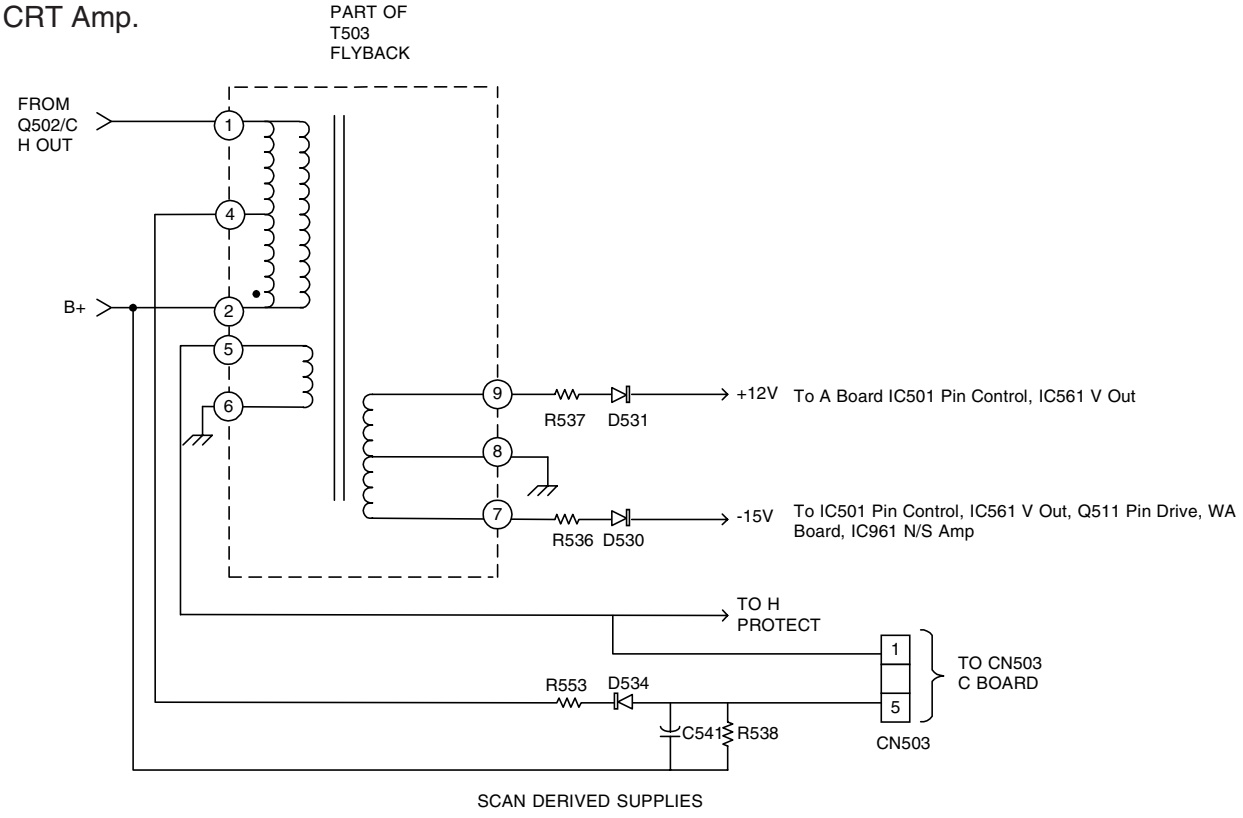
6CTV26 1190 12 22 99

Flyback Secondary Voltages Distribution

The following voltages are scan derived. This means that some windings of the flyback transformer have their signals rectified to create additional power supply lines:

- 200 Volts C Board IC1701 CRT Amp
- +12 Volts A Board IC501 Pin Control, IC561 V Out
- -15 Volts IC501 Pin Control, IC561 V Out, Q511 Pin Drive, WA Board IC961 N/S Amp

The scan-derived supplies are developed when the output from Q502 H Out is input to T503 Flyback Transformer. This signal is used to create the boosted B+ (+200) on the primary side and the +12 and –15 volts on the secondary side. The signal from T503/4 is sent through R553 and rectified by D534. This voltage is output from CN503/5 on the A board to CN503 on the C board. This voltage is used to supply IC1761 CRT Amp on the C board. This connector can be disconnected to check to see if the problem is with IC1761 CRT Amp.



The +12 volt line is derived from the signal at T503/9. It is sent through R537 and rectified by D531. In the event that a short occurs on this line, R537 may open. Since the vertical output is supplied by this line, R537 should always be checked if a vertical output failure is suspected.

The -15 volt line is derived from the signal at T503/7. It is sent through R536 and rectified by D530. In the event that a short occurs on this line, R536 may open. Since the vertical output is supplied by this line, R536 should always be checked if a vertical output failure is suspected.

In addition to the scan derived supply voltages, T503 Flyback Transformer also develops heater voltage from T503/5. T503 also develops high voltage, focus voltage and ABL.

The table below describes various symptoms that can occur if there is a short on any of the power supply lines. These types of problems occur when major components being supplied fail by shorting. An example would be if the audio amp were to fail the set might shut down as if the Audio B+ line were shorted.

Many times observing all the symptoms can lead you towards the correct failed component or problem. All of your senses should be used when troubleshooting. What you see, hear and smell can often lead you to quick fix.

Voltage	Relay Clicks	Video	Audio	Timer LED	HV	Power Switch OFF	Suspect
+135 *	2 clicks very close together Power Only	None	None	Blinking	None	No relay click but Timer LED stops blinking	Q502 H Out, T503 Flyback, Q512 Pin Out
+12	1 click. Power relay only.	IK lines visible. OSD expanded almost off screen	OK	Normal	OK	Unit shuts off normally.	WA board problem or Q301 or IC353 on A Board
+9	2 clicks Power Relay and Degauss relay. Degauss relay never turns OFF	None	None	Blinking	None	Both relays turn OFF and Timer LED stops blinking.	Regulators on A board .
Audio B+**	Normal	Normal	None	Normal	Normal	Normal	PS1461 AK Board
+200	2 clicks very close together Power Only	None	None	Blinking	None	No relay click but Timer LED stops blinking	IC1761 CRT Amp. Disconnect CN1764 to verify.
+12	3 clicks. 2 Normal but then an extra click indicating shutdown.	None	None	Blinking	None	No clicks.	IC561 Vertical Output. Check R537.
-15	2 clicks. Power and Degauss	None	None	Blinking	Starts to come up but stops after 2nd click	2 clicks when set is turned OFF.	IC561 Vertical Output. Check R536
Converter not switching	1 click. Power Relay only.	None	None	Blinking	None	1 click. Power Relay only.	IC601 and/or R607

* May cause the IC601 Converter to fail. **May cause shutdown similar to +135 if fuse doesn't blow.

Power Supply Protection

Overview

There are three different circuits that can activate the protection latch. One is the OCP (Over Current Protection) for the +135 volt line. The other two are related to the voltage from T605/3 Foldback Winding. When one of these circuits activates the latch, RY600 is turned OFF. This disconnects the AC from the circuit that develops Converter B+ and can be noticed during troubleshooting when two clicks are heard in quick succession.

Latch

Placing a HIGH on Q653/B activates the latch. This turns ON Q653 that turns ON Q652. Once Q652 turns ON, its conduction keeps Q653 ON until power is disconnected. This places a LOW at Q648/B, turning it OFF. This causes RY600 Power Relay to open and the set turns OFF.

+135 Over Current Protection

Over current is detected by monitoring the voltage across R652. When this voltage, which rises as more current is drawn, gets to a level that causes Q651 to turn ON, the latch will be activated.

Vcc Rectified Low Voltage Protect (LVP)

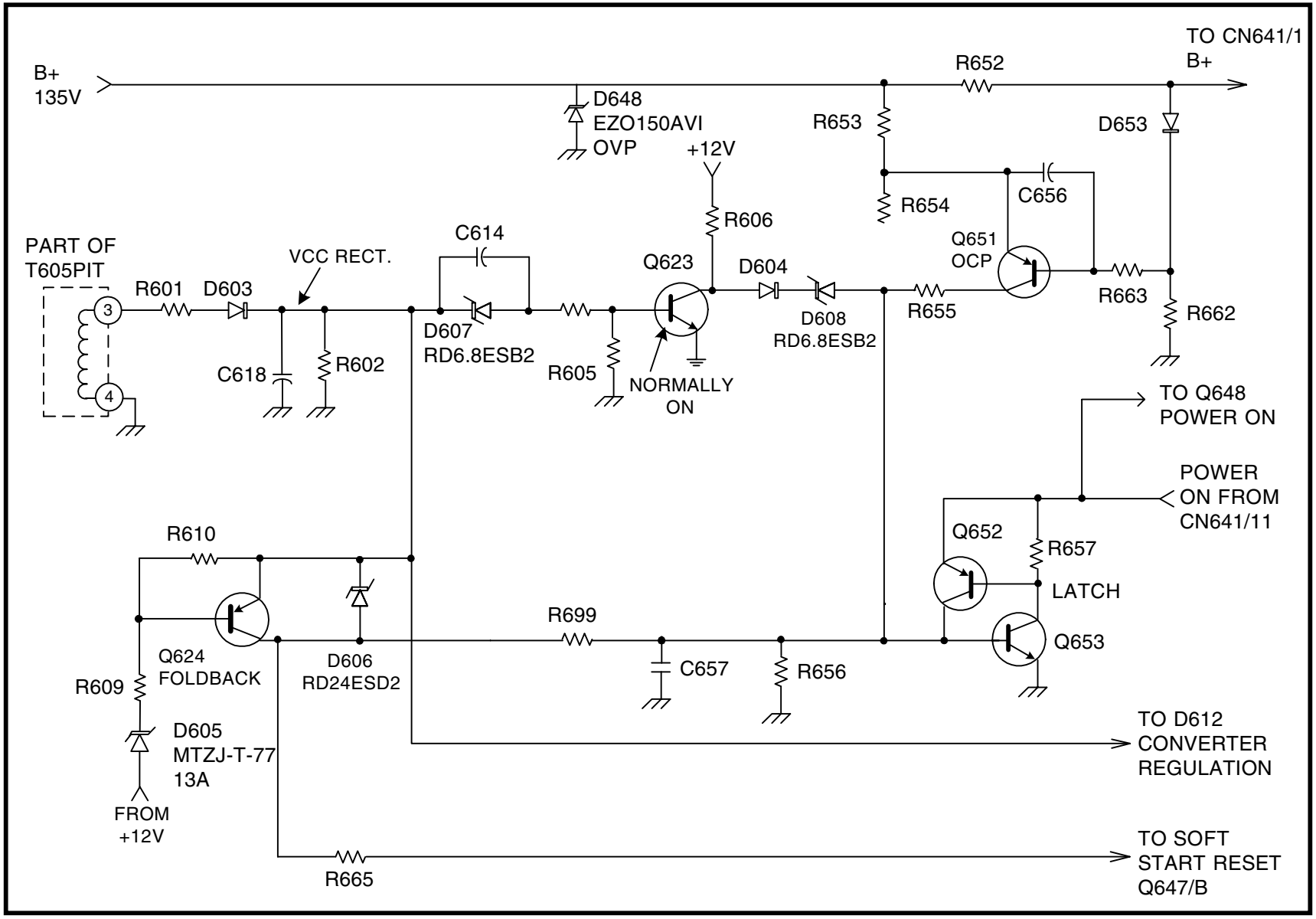
The signal from T605/3 is sent through R601 and rectified by D603. This voltage is filtered by C618. It is important that this voltage be at a certain level since it is used to control regulation. Therefore a circuit is constructed in which Q623 is normally ON. This transistor is ON because D607 should always have sufficient bias to turn ON. This will place Q623/C at close to ground level. This keeps D604 and D608 from conducting and activating the latch circuit. If this voltage were to fall below a certain level, D607 would turn OFF, causing Q623 to turn OFF. When Q623 is OFF, the +12 volt line would cause D604 and D608 to turn ON, activating the latch.

Foldback

The foldback circuit is a type of protection circuit that uses a winding on T605 PIT to monitor the current drawn by its secondary. This voltage is rectified and called Vcc Rect. Q624 is set up with the Vcc Rectifier voltage input to the emitter. Its base is connected to the Rectified +12 volt line from the secondary side of the supply, through D605 and R609. D605 is a zener diode whose breakover voltage is 13 volts.

This circuit will protect against two failures. The first is a rise in the Vcc Rect. This voltage is developed by the foldback winding of T605. This winding is used as a current mirror. This means that the more current drawn on the secondary of T605 PIT, the higher the voltage at T605/3. When too much current is drawn from the secondary, Q624 would turn ON because of the increase in voltage across R610. If this occurs, the latch and soft start circuits will be activated. Soft start is activated to lower the output supply voltage by increasing the switching frequency. The latch's purpose is to shut the supply down.

Secondly, if there were a loss of the +12 volt line then D605 would breakover. This would cause sufficient current flow through R610 and Q624 would turn ON. If this occurs, the latch and soft start circuits will be activated.



POWER SUPPLY PROTECTION

1CTV26 1185 3/22/00

Vertical Deflection

The vertical deflection stage consists of the Vertical oscillator, Vertical amplifier, Flyback generator and the Deflection yoke.

The purpose of this stage is to manufacture a magnetic field. The magnetic field will bring the electron beam gradually from top to bottom (vertically) and then quickly back to the top (beam retrace) of the screen to start over again.

Vertical Oscillator

When the TV is turned ON, Set +9Vdc appears at Y/C Jungle IC301/33 and 44. The internal horizontal oscillator begins and is counted down (divided) to 60 Hz to become the vertical drive signal.

The drive signal is formed into a positive and negative ramp and its amplitude and linearity are determined by the serial data from IC001 Tuning Micon. If the data or clock signal at IC355/34 and 35 were missing, there would be NO vertical drive at IC301/13 and 14.

Vertical Amplifier

IC561 Vertical Output is a single package vertical amplifier that outputs a waveform with sufficient amplitude and current to drive the deflection yoke. It is powered by +12 and –15 volts from the flyback transformer secondary.

Flyback / Boost Generator

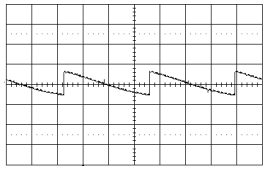
The vertical boost signal is used to generate extra current in the deflection yoke during the retrace period. This extra current is used to quickly return the electron beam to the top of the picture.

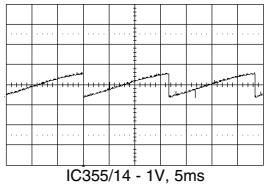
The flyback generator stage within IC561 uses the vertical signal to make a 30Vp-p pulse needed during retrace time. The retrace portion of the vertical drive signal input IC561/1 and 7 is extracted and amplified, and appears at pin 3 as a 30Vp-p pulse. It passes through C565 to provide sufficient current to power IC561/6 during retrace time. Diode D561 blocks this pulse from the +12 volt source.

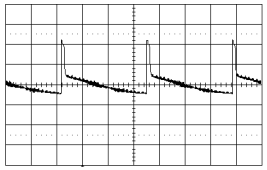
The vertical flyback pulse from IC561/3 is sent to the WA board to be used by the Quadra Pole Focus circuit. It is also goes to C564. C654 blocks any DC and allows the flyback pulses to be applied to Q652/B. These pulses keep Q652 ON and prevents C563 from charging. Therefore Q561 is always OFF while the set is operating normally. If the vertical flyback pulses were missing, the voltage from the 12-volt line through R570 would forward bias Q561 B-E. This would apply a low to IC355/15 VM Out/V Protect. If IC355/15 were to receive a LOW, the IC would blank the video. If there were problems in this area when the unit is initially turned ON, the result would be similar to an AKB problem. The degauss relay would not turn OFF and the Timer LED would be flashing.

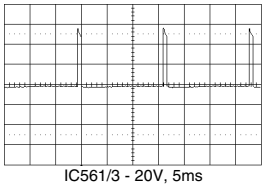
Deflection yoke

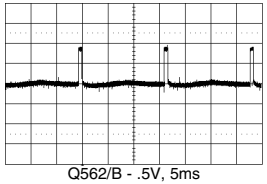
The deflection yoke translates the electrical current flowing through its coils into a magnetic field that positions the election beam vertically. Current flowing through the deflection yoke coil is returned to ground through R578, R563 and R559 and TH501, which are in series. The thermistor is used for temperature compensation. As the vertical yoke draws more current, the resistance of TH501 lowers, allowing more current to flow to the yokes. The voltage developed across these resistors is fed back to the inverting input of IC561/1 through R566 to improve linearity.

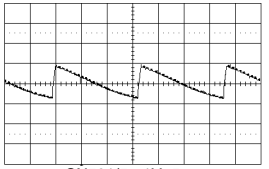

IC355/13 - 1V, 5ms

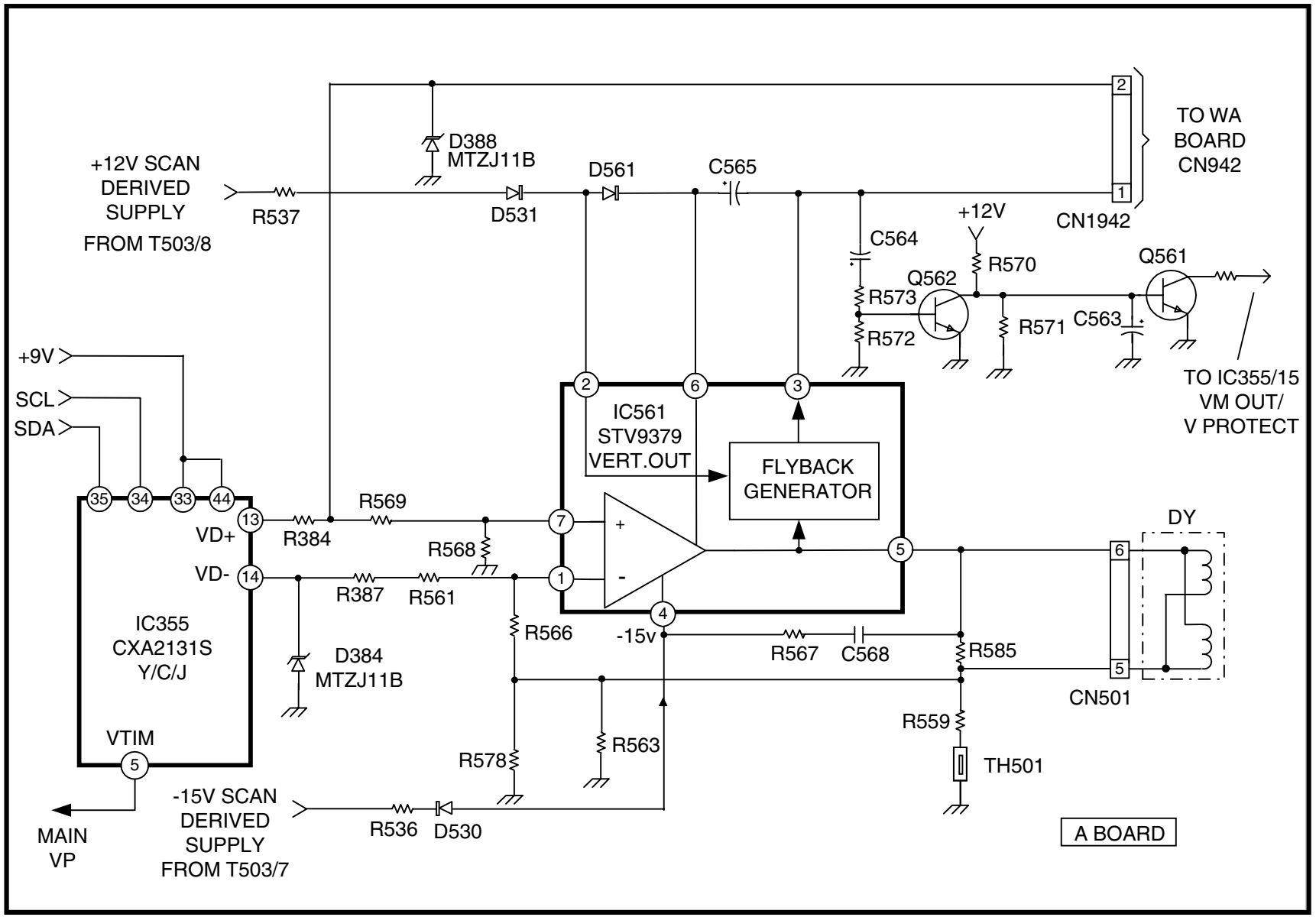

IC355/14 - 1V, 5ms


IC561/5 - 20V, 5ms


IC561/3 - 20V, 5ms


Q562/B - .5V, 5ms

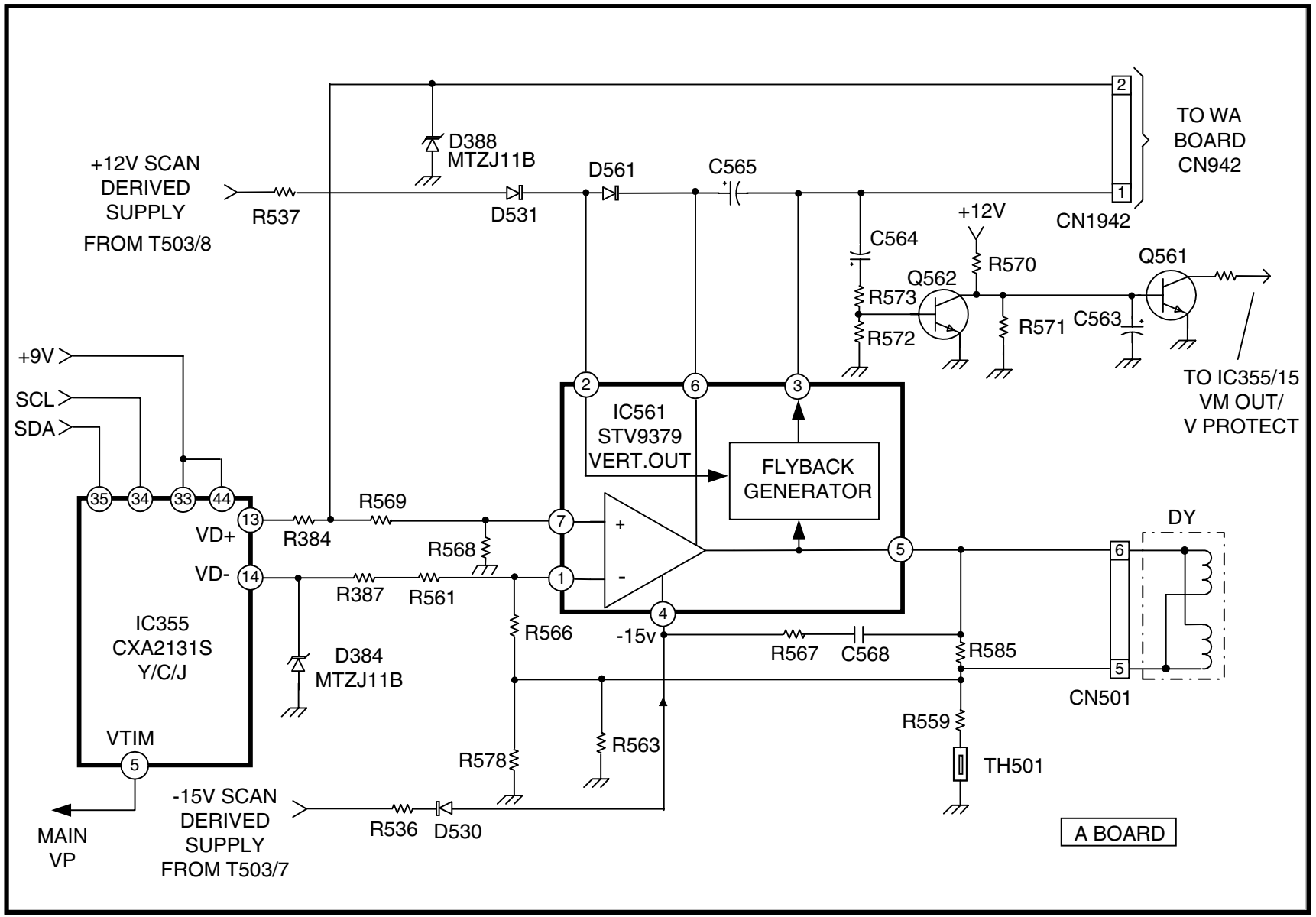

CN501/5 - 1V, 5ms



VERTICAL DEFLECTION

10CTV26 1194 1/4/00

Failure	Relay Clicks	Video	Audio	Timer LED	HV	Power Switch OFF
Open Yoke	Two clicks. Degauss never turns OFF.	None	Normal	Flashing	Normal	Two clicks. Power and degauss relays as normal.
Short on Output	Two normal clicks, but third click (degauss) isn t heard for 30 seconds.	No video for 30 seconds, then flashing horizontal line across the screen. Line is about 1 inch thick.	Normal	Flashing for first 30 seconds then stops.	Normal	Two clicks. Power and degauss relays as normal.
+Missing data or clock	Three relay clicks, Power Relay, degauss and then degauss again Second degauss click occurs quicker than normal	None	Normal	**Not** flashing	Normal	Two clicks. Power and degauss relays as normal.
Missing Scan derived +12 volts	Three relay clicks. Two are normal, third is shutdown.	None	May or may not be heard before shutdown	Flashing.	Comes up until shutdown.	No click.
Missing Scan derived 15 volts	Two clicks - Power and Degauss relays.	None	May or may not be heard before shutdown	Flashing.	Normal.	Two clicks. Power and degauss relays as normal.
Shorted or open C565	Normal three clicks	Yes but there are two red green and blue lines each in the top half of the picture. If video is input, these lines remain and white retrace lines are seen in the top	Normal	Normal. Flashes until picture is displayed	Normal	Two clicks. Power and degauss relays as normal.



VERTICAL DEFLECTION

10CTV26 1194 1/4/00

Horizontal Deflection Block

Overview

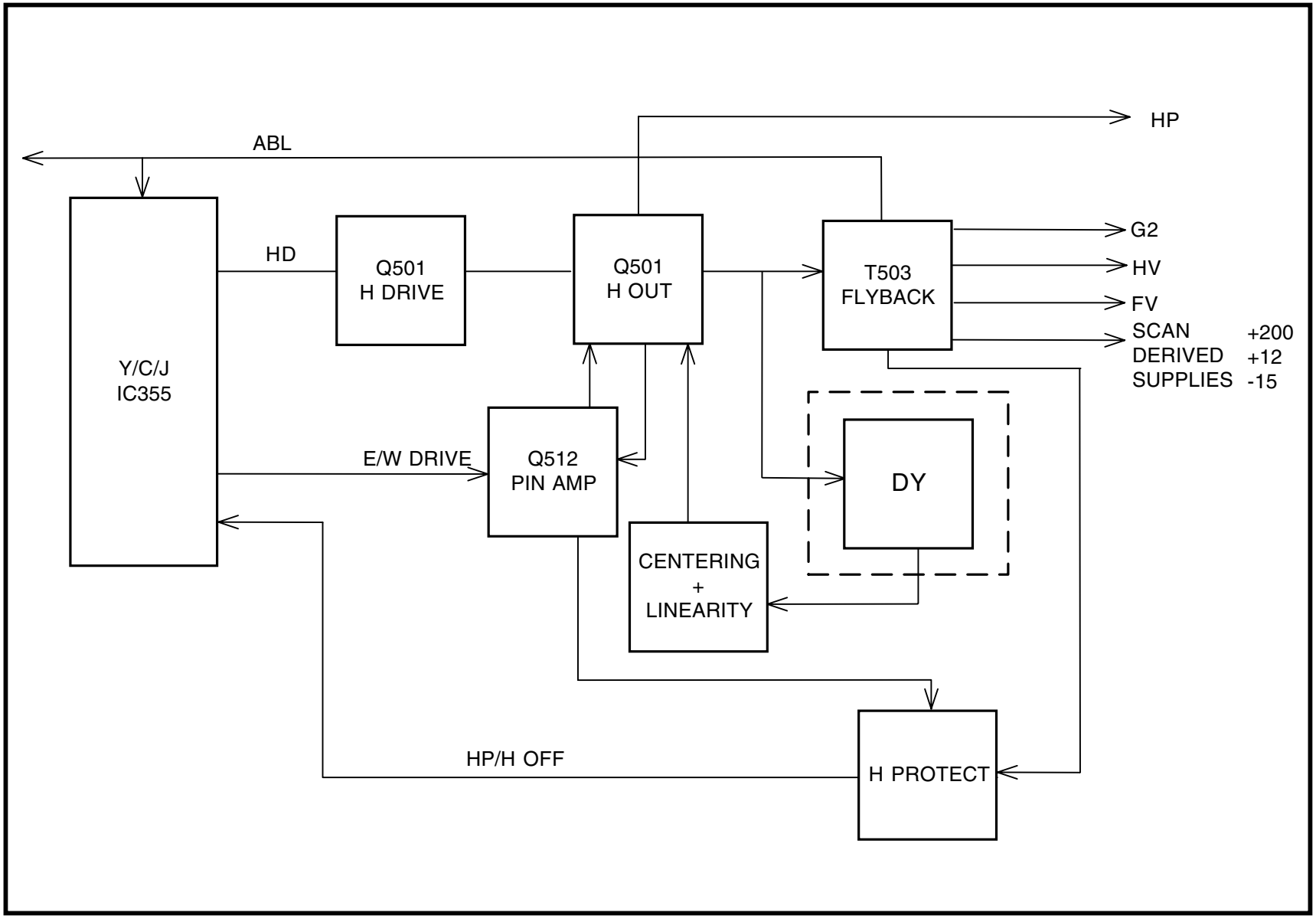
The horizontal deflection block creates the signal that drives the horizontal yoke and also drives the flyback transformer to create the necessary high voltage, focus voltage and other voltages used by the set.

The HD signal originates from the Y/C/J. The HD signal is applied to the amplifiers in the H drive and H Out circuits. The signal that exits the H Out transistor is applied to the flyback transformer and the deflection yoke. The deflection yoke uses magnetic fields formed by the current through it to drive the beam across the screen. Feedback from the yoke is coupled to the centering and linearity circuits. This circuit ensures that the picture will be linear and centered properly. These circuits work in conjunction with the pin amp on the return to the H Out.

The purpose of the pincushion circuit is to correct for deflection distortion, which occurs because of the yoke's inability to create a linear beam scan. The result would be a picture bowed at the sides. We compensate for this problem by using pincushion correction circuits to control the amount of current that can flow through the horizontal output's return.

More current is delivered so the beam can be pushed to the sides of the tube when necessary. The drive for the Pin amp is created in the Y/C/J and is called E/W drive. It is applied to the Pin amp with a sample of the HP pulse. Q512 controls the current through the H Out return.

A protection circuit also monitors the HP signal. This protection circuit allows HP signals to pass to the Y/C/J if the Pin amp and H Out circuits are operating normally. In the event of a failure, the HP/Hoff line to the Y/C/J would go LOW. The Y/C/J would then disable HD, which would cause high voltage to be lost.



HORIZONTAL DEFLECTION BLOCK

14CTV26 01/01/00

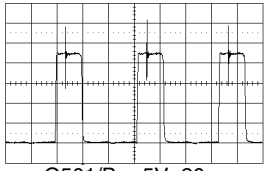
Horizontal Out

Overview

The horizontal output circuit below consists of the Horizontal Oscillator, Horizontal Drive, Horizontal Output, Flyback and Horizontal Centering and Linearity.

Horizontal Oscillator

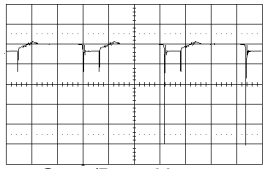
When the TV is turned ON, Set +9Vdc appears and is applied to Y/C Jungle IC355/33 and 44. IC355 contains a horizontal oscillator that is shaped into a horizontal drive pulse that leaves at pin 19.



Q501/B - .5V, 20us

Horizontal Drive

Q501 amplifies this HD signal and outputs the signal from its collector. This signal is coupled by T501 to drive the horizontal output Q502 B-E junction.



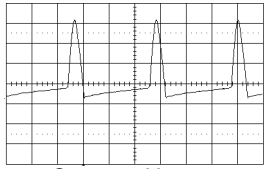
Q502/B - 10V, 20us

Horizontal Output

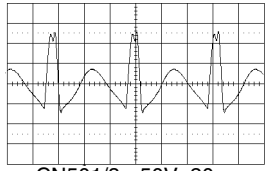
Q502 is the H output transistor and it drives two circuits:

- The deflection yoke – Develops a magnetic field in order to move the electron beam from left to right on the screen.
- The flyback transformers – Develops high, focus and screen voltages. The scan derived power supplies are also developed here. They are +200 volts, +12 volts and –15 volts for the CRT Amp and TV's vertical section. Heater voltage for the tube's filament is also developed here. The horizontal protection circuit also uses the heater voltage.

The HP pulse is fed back to monitor the frequency of the horizontal oscillator. The horizontal output is also modulated by Q512 Pin Out. This is necessary to correct for pincushion distortion that would be seen if correction were not used.



C510 - 10V, 20us

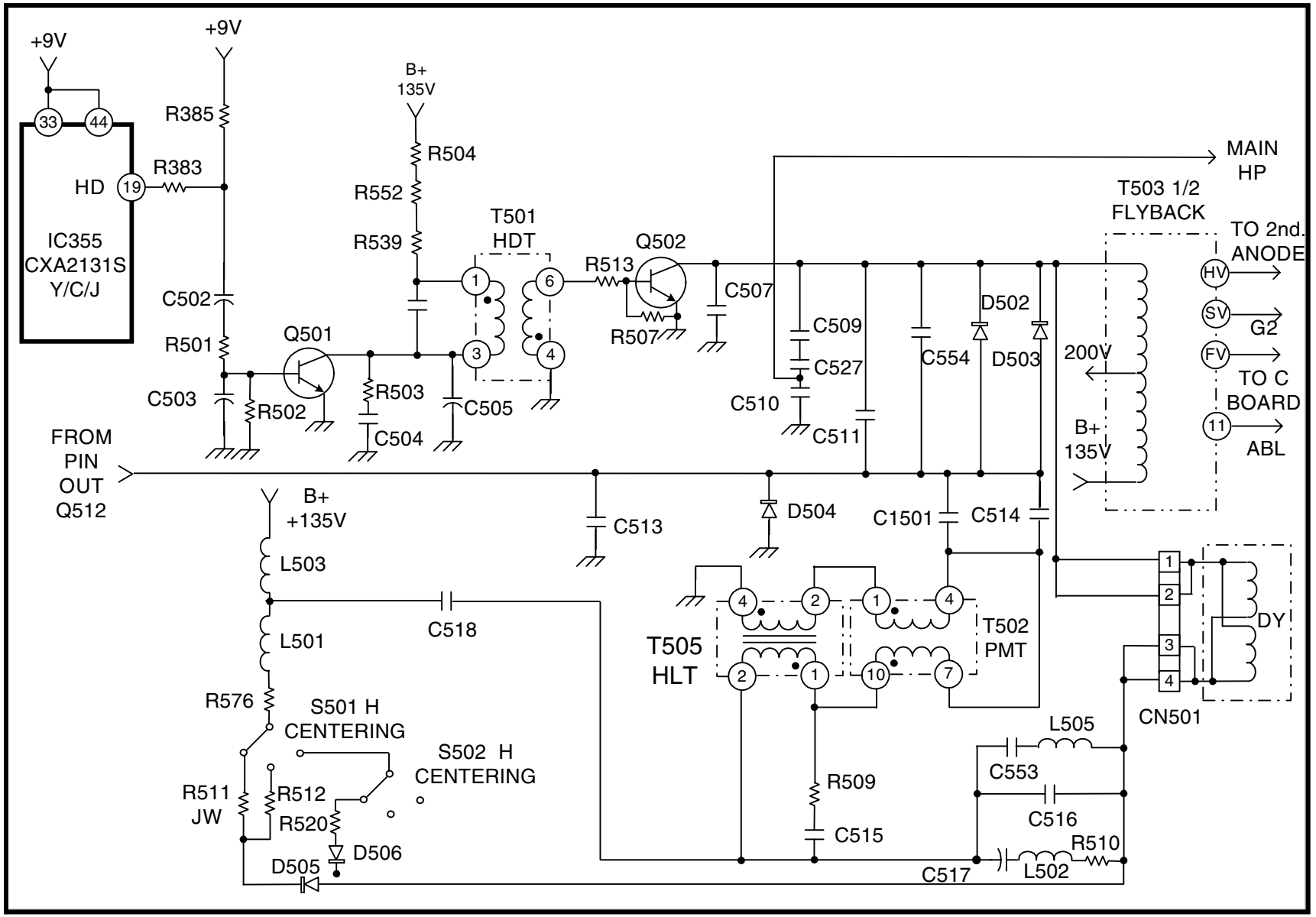


CN501/3 - 50V, 20us

Horizontal Centering and Linearity

Changing the DC voltage at the return line of the horizontal yoke performs horizontal Centering. The +135 volt line is switched through a series of voltage dividers using S501 and S502. The different combination of switch settings changes the DC level at the yoke return and, consequently, the centering of the picture.

Horizontal linearity is determined by feeding back the yoke return signal through an elaborate filter network, which is made up of T505 and its associated components to reference of the horizontal output.



H OUT

11CTV26 1193 12/22/99

Pincushion

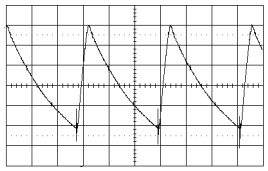
Overview

The purpose of the pincushion circuit is to correct for deflection distortion. This distortion occurs because of the yokes inability to create a linear beam scan. The result would be a picture bowed at the sides. We compensate for this problem by using pincushion correction circuits to control the amount of current that can flow through the horizontal output's return. More current is delivered so the beam can be pushed to the sides of the tube when necessary.

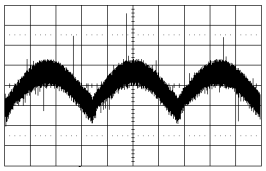
Circuit Description

The E/W signal from IC355/11 is input to IC501 Pin Control at its inverting input. A sample of the ABL signal from T503/11 is also input to this same input.

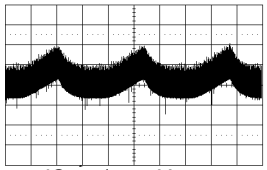
The main HP signal from C510 in the Horizontal Output section is applied to R524. The signal is applied to a clamp that consists of D518, D523 and D524. It is also applied to R525 and D516. This signal is now stripped of its negative component and integrated by C530. This signal is then applied to IC501/5 non-inverting input. IC501 Pin Control compares the inverting and non-inverting inputs and outputs their difference. The result is output at IC501/7.



IC501/5 - .5V, 20us



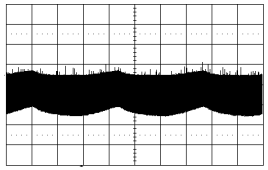
IC501/6 - .2V, 5ms



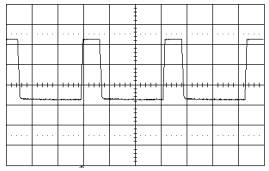
IC501/7 - .5V, 5ms

This signal is then applied to the base of Q511 Pin Out. The signal is inverted by Q511 and then input to the base of Q512. The result is that a PWM waveform is seen at Q512/C. Q512/C is connected to the return for the horizontal output. When Q512 Pin Out is conducting it allows more current to be drawn by the horizontal yoke. The conduction of Q512 is set up so that more current is drawn during the middle edges of the scanning of a horizontal line. The result is shown where the output leaves this circuit at R526.

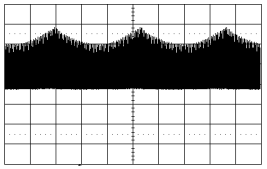
The H Protect circuit will remove the horizontal drive signal if the HP pulses are not input to IC501/5. This will also occur if Q511 or Q512 short.



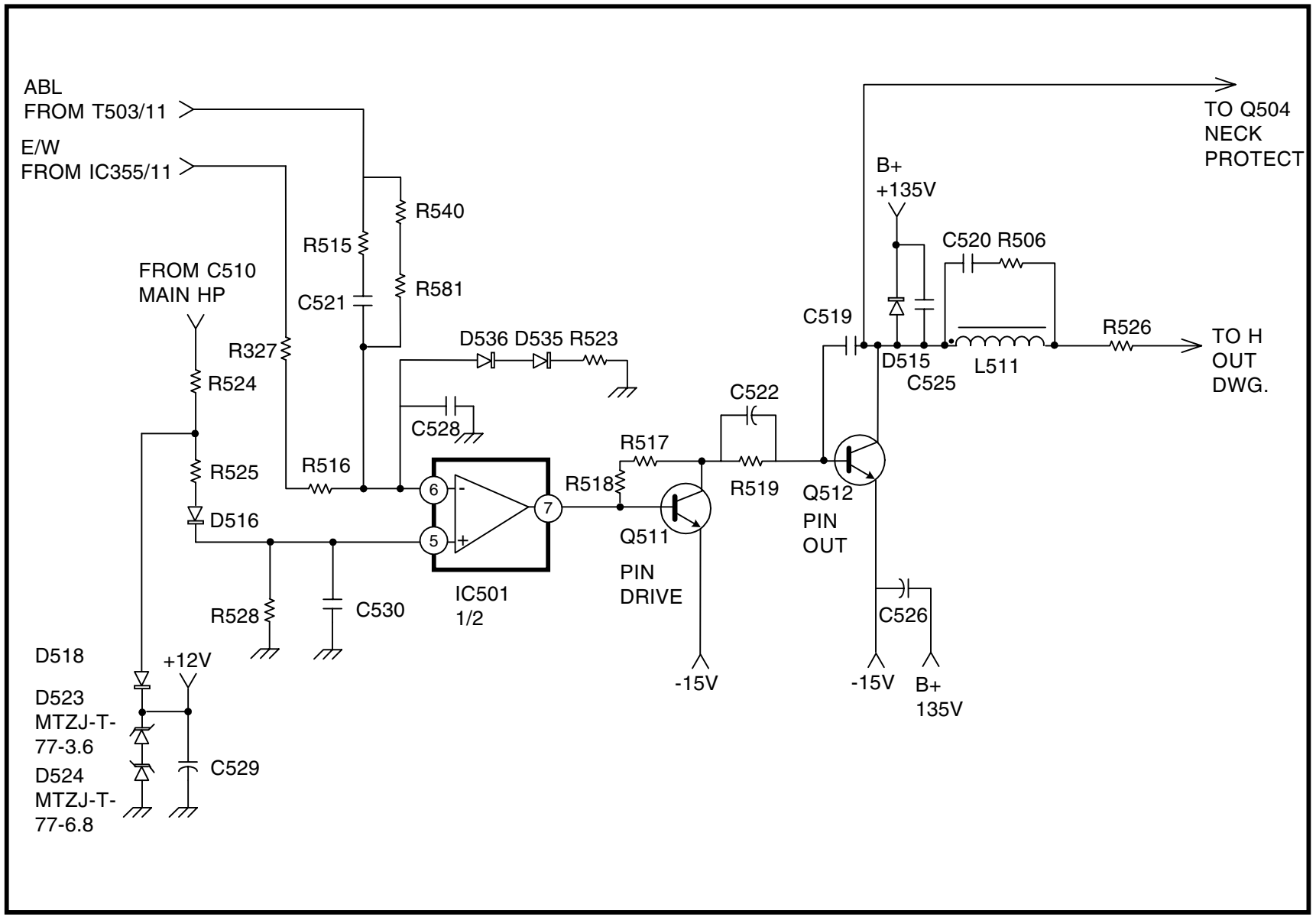
Q512/B - 2V, 5ms



Q512/C - 50V, 20us



R526 - 100V, 5ms



PINCUSHION

12CTV26 1/1/00

H Protect

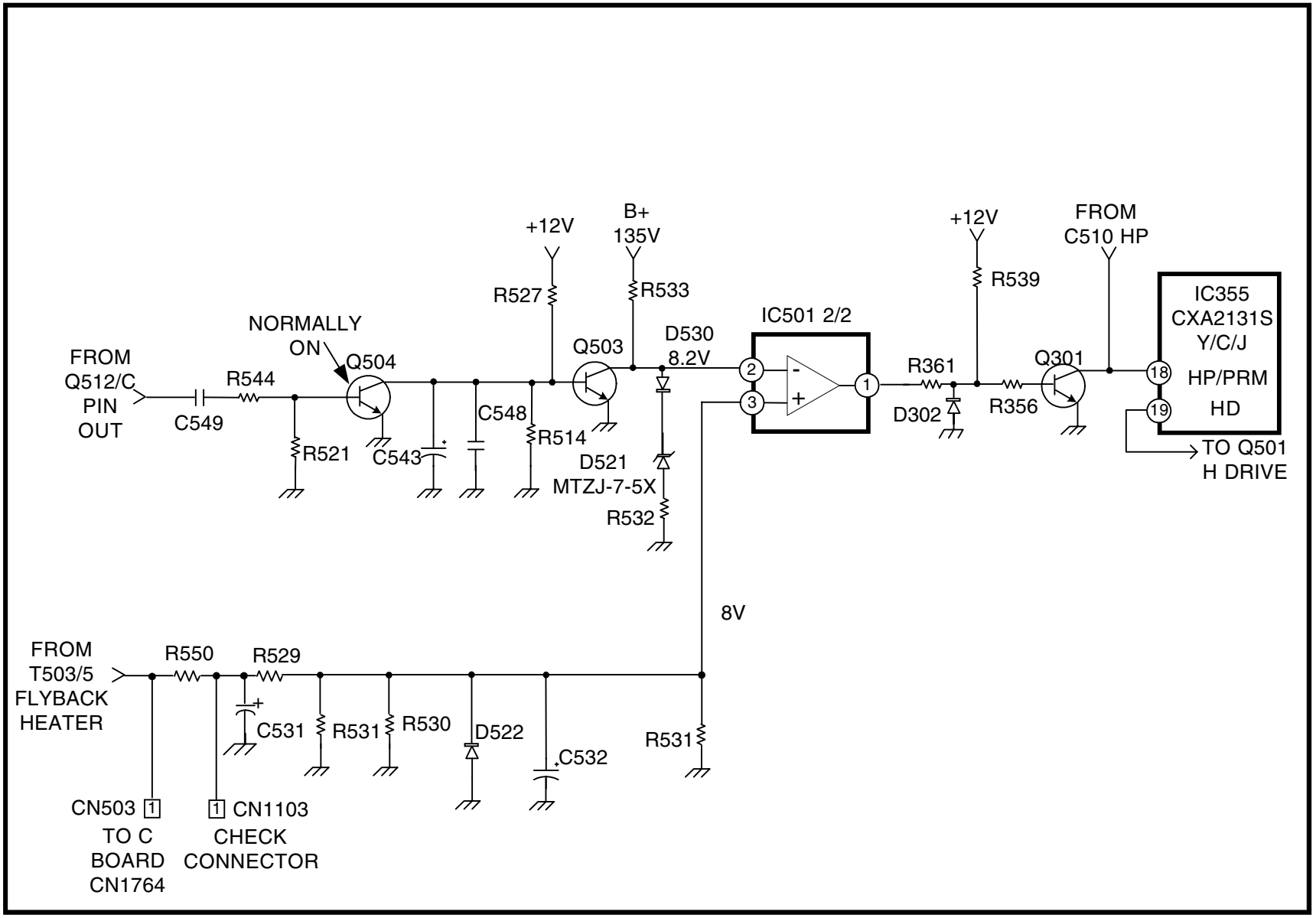
Overview

The H protect circuit is used to shut down the horizontal deflection circuit if the high voltage should rise above the acceptable level or if the pincushion drive circuit. Pulses from the flyback transformer's heater winding are compared against a reference voltage. The reference voltage can be removed based on the condition of the Pin Out circuit. Loss of Pin Out will cause horizontal protection to be indicated. When H protect is detected, HP pulses will be removed from IC355/19 HP/Hoff. Video and HV will be disabled, but the power supply will continue to function.

Circuit Description

When the horizontal circuit is operating normally, a signal is output from T503/5 that is used to supply voltage to the filaments of the tube. At this point R550, R529, C531 and C532 filter the signal to a DC voltage. This DC voltage is input to IC501/3 non-inverting input. This voltage is compared to a reference voltage of 8.2 volts. This reference voltage is derived by a voltage divider consisting of R533, D520 and D521. As long as IC501/2 is greater than IC501/3, the horizontal circuit is operating normally.

IC501/2 is also connected to Q503/C. Q503 is OFF as long as the signal from the Pin Out circuit is working normally. If the Pin Out signal were missing, Q504, which is normally ON, would turn OFF. If Q504 were to turn OFF, Q503 would turn ON. This would place IC501/2 at ground potential. In that case, IC501/1 would output +12 volts that would turn Q301 ON and ground the HP signal that is connected to Q301. If Q301 turns ON, IC355 would shut OFF the drive signal at IC355/19 HD. When the drive signal is removed, the High Voltage is removed from the set. This will cause a no video condition, but the Timer LED will not begin to blink. If the set is turned on with a failure that causes H protect to occur, High Voltage would begin to come up and then disappear. The timer LED would blink to indicate that the AKB circuit did not unblank the video. The Timer LED only indicates an AKB failure when the set is turned from OFF to ON.



H PROTECT

13CTV26 1195 1/4/00

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Service Bulletin
TV Products

Model: KV-27FV15

No. 412

Date: October 1, 1999

Subject: Part Number Correction
Reference No. 4, A Board

Symptom:
(XXXX) The part number listed on page 66 of the Service Manual for Ref # 4, A Board, is incorrect.

Solution: Please note the correct part number as shown below.

REF	DESCRIPTION	PART NUMBER	
		INCORRECT	CORRECT
4	A BOARD	A-1298-866-A	A-1298-886-A

The part number is listed correctly on page 69

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Service Bulletin
TV Products

Model: KV-36FS10, KV-36FV15, KV-36XBR250
SU-36FD2

No. 415

Date: October 1, 1999

Subject: Glass Stand Door rubbing on bottom of cabinet

Symptom:
(161X) Glass doors, of the SU-36FD2 stand, rubbing on bottom board, Glass door scraping off vinyl on bottom board, and bowing of bottom board when unit is positioned on high pile carpet.

Solution: If the customer should complain of the symptoms above please do the following:

Service Part Kit	4-074-400-01

1. Order the Service Part Kit See Fig 1

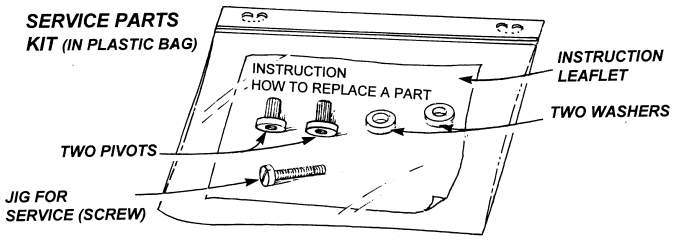

Fig 1

2. Use the Jig Screw to remove the original pivot by inserting the screw into the pivot hole and pulling down. See Fig 2

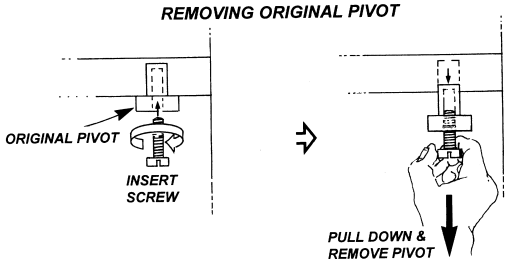

Fig 2

Replace the Pivot on the top of the Glass Doors, and add the washer to the bottom pivots. See Fig 3.

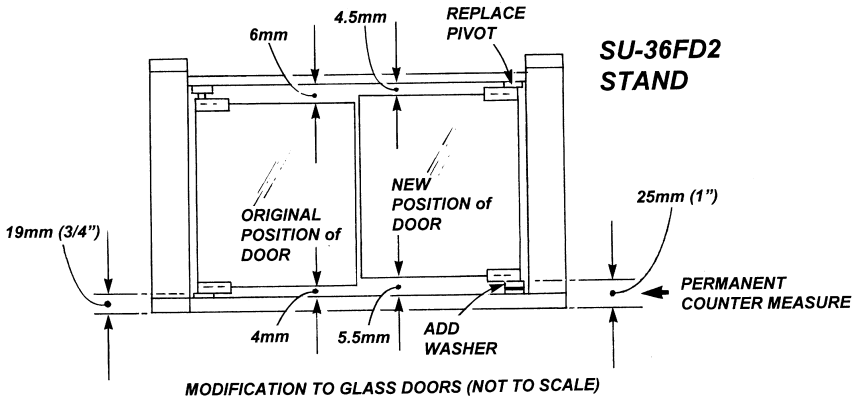

Fig 3

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TV Products

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Model: KV-27FV15, KV-32FS10, KV-32FV15
KV-32XBR250, KV-36FS10, KV-36FV15
KV-36XBR250

No. 417

Date: October 7, 1999

Subject: Blinking Picture With Local Weather Channel

Symptom:
(2314) On the Weather Channel when the program switches from the national to local weather the picture may, jump, blink, or may blank out.

Solution: If the customer should complain about the symptoms above then please check in the Service Mode that VSS=1. If not change VSS to 1 and recheck to verify if the problem is solved

if the symptom is still present then change the jungle IC355, on the A Board, with the new type below. The adjustments for Vertical, Horizontal, Color, and Hue will also needed to be re-adjusted.

Ref	Old	New	Part Number
IC355	CXA2131S	CXA2131AS	T-998-606-67

IV

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Service Bulletin
TV Products

Model: KV-27FV15, KV-32FS10, KV-36FS10
KV-32FV15, KV-36FV15, KV-32XBR250
KV-36XBR250

No. 422

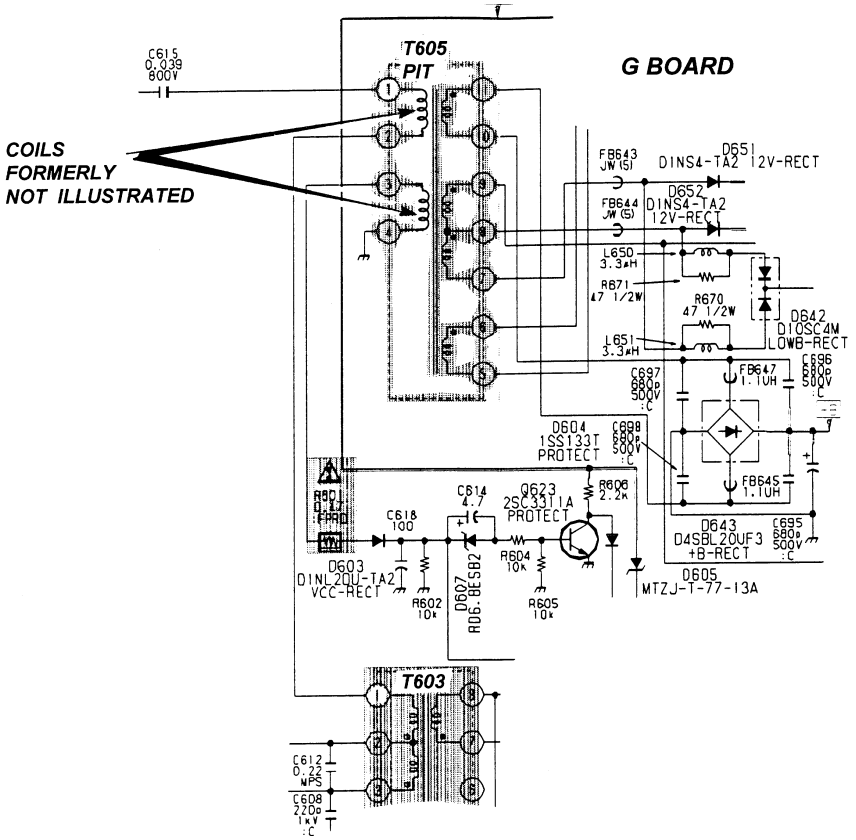
Date: September 20, 1999

Subject: G Board Schematic Correction

Symptom:

(xxxx) On the G Board Schematic the winding connections inside T605 is incorrect. The windings between T605/pins 1 & 2, and windings 3 & 4 are missing.

Solution: Please refer to the corrected schematic below. The proper connections have a winding between T605/pin 1 & 2, and T605/pin 3 & 4. There is no winding between T605/pins 2 & 3 as in the service manual schematic



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Model: KV-32FS10, KV-32FV15, KV-36FS10
KV-36FV15, KV-32XBR250, KV-36XBR250

No. 424

Date: October 7, 1999

Subject: V Bow and H Trap Adjustments

Symptom:
(xxxx) V Bow and H Trap Adjustments are missing from the Service Manual

Solution: If the customer complains of poor geometry, (trapezoidal or bowing) the following adjustments might be needed.

V-Bow Geometry distortion; like the picture in Fig 1 can be readjusted by using the Y-Magnets. The Y-Magnet is located on the Neck Assembly CRT side See Fig 3.

Fig. 1. Before

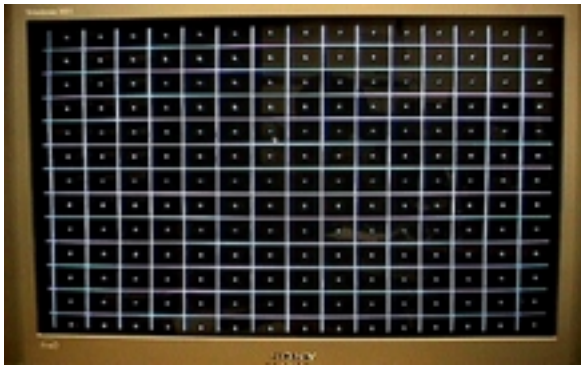
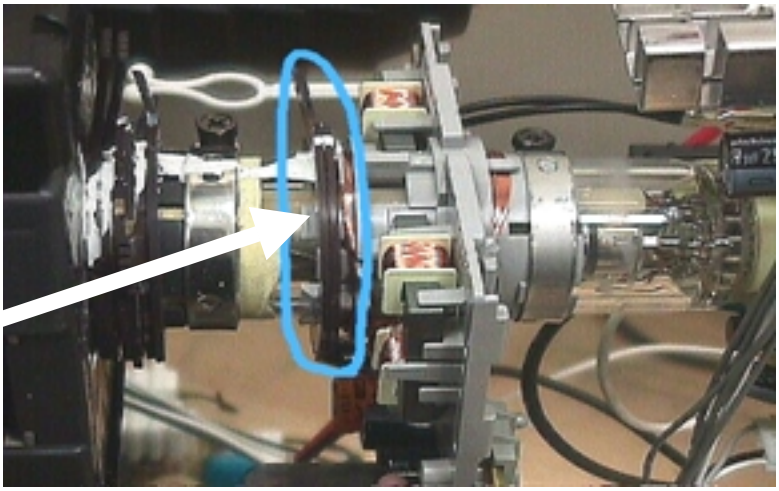


Fig. 2. After



A djust the taps simultaneously to achieve the best geometry. After adjusting this magnet, please confirm the over all geometry again. (V-Trap, etc could also affect the geometry as well.)

Reference: Tomohiro Mori

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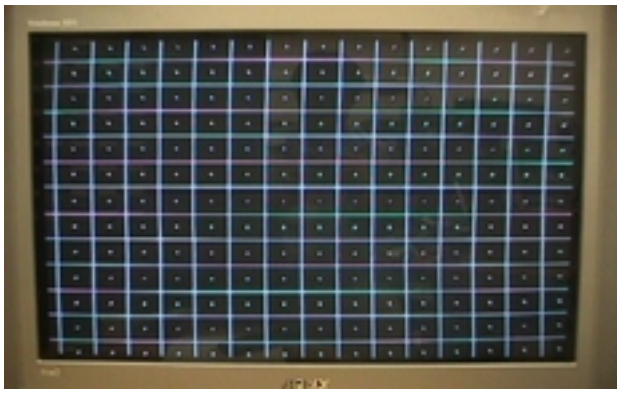
Adjust the taps simultaneously to achieve the best geometry. After adjusting this magnet, please confirm the over all geometry again. (V-Trap, etc could also affect the geometry as well.)

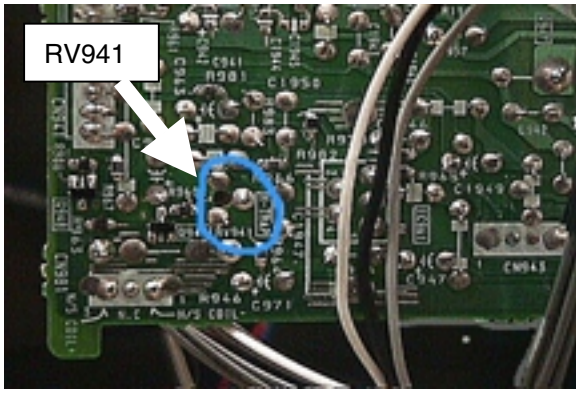
H Trap Distortion:

If H-Trapezoid geometry is present, you can adjust the H trap (RV941) on the WA Board. (See Fig 4)

After adjusting check the overall geometry again since V Bow can also affect the Trapezoid distortion.



H-Trap



WA Board RV941

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Service Bulletin
TV Products

Model: KV-24FV10, KV-27FV15, KV-32FV1, KV-32FS10
KV-32FV15, KV-32XBR200, KV-32XBR250
KV-36FV1, KV-36FS10, KV-36FV15
KV-36XBR200, KV-36XBR250

No. 425

Date: October 7, 1999

Subject: Part Number for TLH Plate

Symptom:
(XXXX) Need the part number for the TLH plate, which slides into the Yoke.

Solution: If a yoke needs replacement, the TLH plate should be removed from the old yoke, and inserted into the new yoke. If the TLH Plate was lost or misplaced the TLH plate part number is listed below.

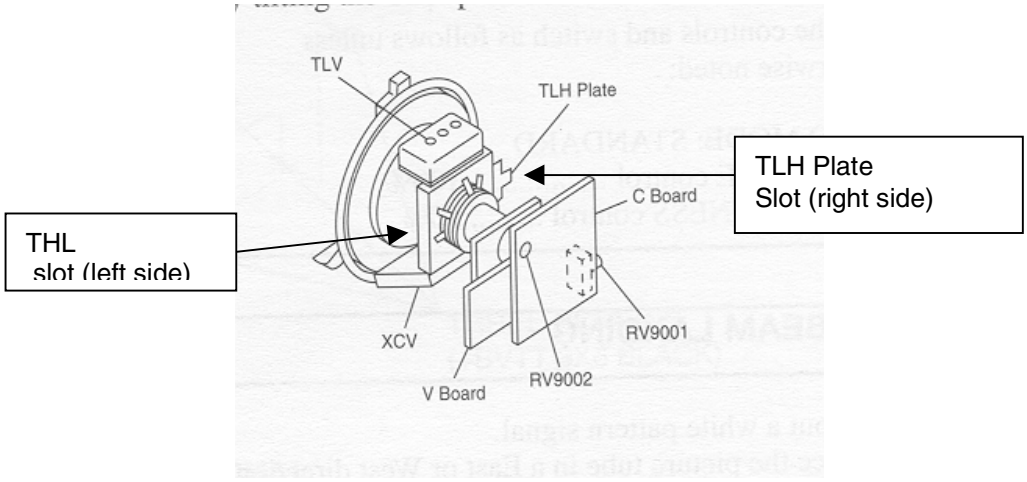
Chassis	Description	Part Number
AA-2H, AA2-W	TLH Plate (Gray)	2-163-920-11
BA-4C (KV-24FV10)	TLH Plate (White)	4-057-714-01

VIII

NOTE: The two TLH Plates are not interchangeable.

The TLH plate can be inserted into either the left or right side of the Yoke. There is only one plate; therefore during alignment the plate must be tried in both sides of the Yoke to determine the most effective adjustment position.

The alignment procedure for the Yoke replacement can be found in Service Bulletin 387R2



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Service Bulletin
TV Products

Model: KV-32XBR250, KV-36XBR250

No. 432

Date: November 4, 1999

Subject: Headphone Part Number Missing

Symptom:
(XXXX) The part number for the Headphone MDR-IF0230 is not listed in the Service Manual.

Solution: Please add the following part number to the Service Manual.

REF	DESCRIPTION	PART NUMBER
	HEADPHONE (MDR-IF0230)	8-953-742-90

Reference: FPR-U1120

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Service Bulletin
TV Products

Model: KV-27FV15, KV-32FS10, KV-32FV15
KV-32XBR250, KV-36FS10, KV-36FV15
KV-36XBR250

No. 438

Date: November 15, 1999

Subject: Control Door Breakage

Symptom:
(161X) Weak or broken Control Door hinges

Solution: If the customer should complain of the above symptom, please replace the Control Door Assembly, with the new improved part.

Model	Description	Part Number
KV-27FV15	Control Door Assembly	X-4037-631-3
KV-32FS10	Control Door Assembly	X-4037-631-2
KV-32FV15	Control Door Assembly	X-4037-631-3
KV32XBR250	Control Door Assembly	X-4037-631-3
KV-36FS10	Control Door Assembly	X-4037-631-2
KV-36FV15	Control Door Assembly	X-4037-631-3
KV-36XBR250	Control Door Assembly	X-4037-631-3

X

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Service Bulletin
TV Products

Model: KV-27FV15, KV-32FS10, KV-36FS10
KV-32FV15, KV-36FV15, KV-32XBR250
KV-36XBR250

No. 441

Date: November 22, 1999

Subject: S-Link, IR Headphone, OSD, and 3D Comb Filter Mis-Operation

Symptom:

(172X) The following Symptoms may occur:

1. **S-LinK:** When the TV detects the S-Link signal in stand-by mode. TV is supposed to automatically turn on and select appropriate video input. It does turn on, but it does not select the appropriate input.

2. **OSD:** When customer tries to enter password for V-chip in Spanish menu, customer will see additional unnecessary letters Pr preceding correct OSD.

3. **IR Headphone:** In XBR models only. When customer swaps audio of main picture and PIP picture, customer can hear the audio of PIP picture even when it is supposed to be blocked.

4. **3D Comb Filter:** In XBR model only, when customer changes video input from S to composite, customer can see a Black & White picture, less than one second, then color returns.

IX

Solution:

If the customer should complain of the following symptoms please do the following:

27 inch models:

1. In the service Mode record on paper the following register information in both RF & Video mode:
   VP SHUE RF Data _____ Video Data:_____
   VP SCOL RF Data_____ Video Data:_____
   VP SSHP RF Data_____ Video Data_____

2. 1) Replace the CPU (IC001)
   2) Enter the service Mode using the remote. Then press 8 then Enter.
   This will reset the CPU, turning the set off then back on automatically.
   3) Re-enter the Service Mode.
   4) In the RF mode replace the data in the SHUE, SCOL, & SSHP with the recorded data from the original CPU.
   5) In the Video mode replace the data in the SHUE, SCOL, & SSHP with the recorded data from the original CPU.
   6) Change the Data of ID7 from 0 to 2.
   7) Write the new data into the CPU using the remote press the Mute then Enter key.

32/36 Non XBR Models:

32/36 Non XBR Models:

1. In the service Mode record on paper the following register information in both RF & Video mode:
VP SSHP RF Data _____ Video Data:_____
DA 2COL RF Data _____ Video Data:_____
DA 2SHU RF Data _____ Video Data:_____

2. 1) Replace the CPU (IC001)
2) Enter the service Mode using the remote. Then press “8” then “Enter.”
This will reset the CPU, turning the set off then back on automatically.
3) Re-enter the Service Mode.
4) In the RF mode replace the data in the 2SHU, 2COL, & SSHP with the recorded data from the original CPU.
5) In the Video mode replace the data in the 2SHU, 2COL, & SSHP with the recorded data from the original CPU.
6) Change the Data of ID7 from 0 to 2.
7) Write the new data into the CPU using the remote press the “Mute” then “Enter” key.

32/36 XBR models:

1. In the service Mode record on paper the following register information in both RF & Video mode:
VP SSHP RF Data _____ Video Data:_____
DA 2COL RF Data _____ Video Data:_____
DA 2SHU RF Data _____ Video Data:_____

2. 1) Replace the CPU (IC001)
2) Enter the service Mode using the remote. Then press “8” then “Enter.”
This will reset the CPU, turning the set off then back on automatically.
3) Re-enter the Service Mode.
4) In the RF mode replace the data in the 2SHU, 2COL, & SSHP with the recorded data from the original CPU.
5) In the Video mode replace the data in the 2SHU, 2COL, & SSHP with the recorded data from the original CPU.
6) Change the Data of ID7 from 9 to 11.
7) Write the new data into the CPU using the remote press the “Mute” then “Enter” key.

Model	Ref	Former	New	Part Number
KV-27FV15	IC001	CXP85856A-029S	CXP85856A-035S	8-752-911-19
KV-32FS10	IC001	CXP85856A-024Q	CXP85856A-035S	8-752-911-19
KV-36FS10	IC001	CXP85856A-024Q	CXP85856A-035S	8-752-911-19
KV-32FV15	IC001	CXP85856A-024Q	CXP85856A-035S	8-752-911-19
KV-36FV15	IC001	CXP85856A-024Q	CXP85856A-035S	8-752-911-19
KV-32XBR250	IC001	CXP85856A-024Q	CXP85856A-035S	8-752-911-19
KV-36XBR250	IC001	CXP85856A-024Q	CXP85856A-035S	8-752-911-19

Model: SONY AE4 Fault area (1): COLOUR

Symptom (1)

Changing background colour in TXT V2.5

Fault

This is a feature of TXT V2.5. Feature can be switched off through TT18. Close off with TT00. TT17 will undo this again if necessary.

Symptom (2)

Blue is predominant.

Fault

Legs of R711 are too long and S/C. Cut legs off to correct size.

Location	Section
C-board	VPA

Model: SONY AE4 Fault area (2): PICTURE

Symptom (2)

Picture runs vertically.

Fault

Deflection processor IC403 is defective through which there is no V-sync on pin 28 of IC403. Replace IC403 SDA9361 no. (8-759-421-42).

Symptom (4)

No picture.

Fault

Short between pin 66 and 67 (on A-board) of IC201.

Symptom (5)

Picture is very dark and only consists of chroma info.

Fault

Poor contact of connector CN1810, connection between A board and B board. Disconnect white wire and restore contacts.

Symptom (1)

Jitters Vertically in PAL plus mode.

Fault

Data corruption or incorrect setting. Via service (TT) mode using the menu keys on the remote control go to "features box" in the devices overview. Set the value of register 78 ('R22 HWE 1 main) in at 65.

Symptom (3)

No sync, only lines.

Fault

Crystal X1801 is defective. Replace X1801 (10MHz) 1-579-175-11 on the B-board VPD (between pin 20 and 21 of IC1816).

Model: SONY AE4 Fault area (3): AUDIO

Symptom (1)

Noisy hissing sound and static from the speakers.

Fault

Sound processor IC201 (MSP3400CPS-C6-T) is defective, replace IC201 (8-759-376-56). The IC is extremely temperature sensitive.

Symptom (2)

Hum from centre and surround speakers.

Fault

Interference of vertical deflection. To reduce hum reposition signal and supply leads between K board and D board. Distance between leads and CN0745 must be as big as possible.

Model: SONY AE4 Fault area (4): POWER

Symptom (1)

Dead.

Fault

Transformer T602 on the G-board has S/C. P/N: 1-427-864-11

Symptom (2)

Dead or switches off immediately. No error code given.

Fault

IC802 (Vertical out) on D-board is defective. R818 and/or R819 possible also open circuit. Replace IC802. Add a diode between pin 2 (IC802) and earth. Do the same between pin 4 and earth. cover the entire top side of the heatsink with insulating tape.
IC802 STV9379 8-759-192-71
D875 MTZL20D 8-719-048-52
D876 MTZL20D 8-719-048-52
R818 0.47ohm 1-249-377-11 (fusible)
R819 0.47ohm 1-249-377-11 (fusible)

Model: SONY AE4 Fault area (5): FUNCTION

Symptom (1)

Dead.

Fault

B board supplies incorrect pulses, causing defective Q802. Replace B board and Q802.

Ref. Description Location Part no.
Q802 2SC3997CA D-Board DFL 8-729-821-07
B-Board B-Board compl. B-Board DFL A-1620-077-A

Symptom (2)

No function.

Fault

. Clock error of the I2C bus signals (SDL and SCL) as a result of a malfunction of the tuner BTP-EC411 (8-598-045-00 or 8-598-045-01). In the tuner change the grounding connection at TSA5512T (PLL).

Model: SONY AE4 Fault area (6): GEOMETRY

Symptom (1)

Picture is too small with pincushion distortion.

Fault

PIN drive Q803 is defective. Replace transistor (FET) Q803 on D-board, no. 8-729-039-68.

USEFUL INFO.

Error reader.
The BE-3D chassis supports the use of the Error Reader. This jig, is available under part number S-188-900-10 (price code S).

The displayed code shows the actual error of the TV set. Refer to the service manual or the table below for an explanation of those codes.

ERROR CODES
02 - Protection circuit trip <ANY TIME>
03 - IIC SCL LOW <POWER UP ONLY>
04 - IIC SDA LOW <POWER UP ONLY>
05 - IIC SDA and SCL LOW <POWER UP ONLY>
06 - Jungle/chroma controller no acknowledge <POWER UP ONLY>
07 - Video switch no acknowledge <POWER UP ONLY>
08 - Tuner no acknowledge
09 - MSP no acknowledge
10 - NVM no acknowledge
11 - M3L TXD LOW <POWER UP ONLY>
12 - M3L RXD LOW <POWER UP ONLY>
13 - M3L ENABLE LOW <POWER UP ONLY>
14 - M3L TXD AND RXD LOW <POWER UP ONLY>
15 - Compact Text test fail <POWER UP ONLY>
16 - AV switch cannot power on reset
17 - Cannot initialise jungle
18 - NVM acknowledge fail after initialisation
19 - Multiple devices with no acknowledge <POWER UP ONLY>
20 - Compact Text run-time failure
21 - AVSWITCH response failure after power up
22 - JUNGLE/CHROMA controller response failure after power up
23 - Compact Text does not respond
24 - Sound processor run time failure
25 - M3L bus clock low time-out after data sent (run time failure)
26 - M3L bus clock low time-out afetr data sent (power up)
27 - M3L bus clock low time-out afetr data sent (initialization)
28 - DSP run-time failure.

Replacement of HV transformer.
Two types of high voltage transformer are used (removable or fixed focus cable). When replacing a line transformer, replace using the original type.

Type	Focus cable	Part no.
A	Removable	1-453-169-12
B	Fixed	1-453-220-11

DEFLECT

Lines tearing when hot.
[32in models only]. Replace line driver transformer T804.

No sync in TXT mode.
Replace IC1001.

PICTURE

Horizontal interference in picture during first half hour.
IC606 is defective. Therefor unstable +9V (pin 3 of IC606). Replace 9V regulator IC606.
Ref. Description Location Part no.
IC606 LM2940T-90 D-board PSU 8-759-267-25

Visible arcing interference on screen when appliance does function. Intermittently switches off when switched on.
Replace line output transformer T803.

Partially blanked horizontally.
Check zener diode D817 (RD5.6ESB2) in blanking circuit, for leaks.

Overbright, nearly negative picture.
Access service mode and enter TT07 to clear.

AUDIO

Hum and/or buzz of the headphones and/or speaker when vol. is low.
Deflection unit generates interference. On board A, solder side, add a thick wire AWG18 200mm long between pins 6,7 and 8 of IC203 and pins 29 and 30 of CN1. Given its critical position, the wire must be kept away from board A.
Part no. Ref.
190090227 Wire AWG18

No sound. Headphones OK.
Fau;t 1: [PS6001 O/C]. Replace audio output chip IC1200 (TDA7264).

Distorted or loud crackling from audio.
Check audio demodulator/processor chip IC202 (MSP3410).

POWER

EHT comes up briefly then nothing. No error code.
[Excess current protection system operating]. Check line output transformer T803.

Intermittently switches off when switched on. Visible arcing interference on screen when appliance does function.
Replace line output transformer T803.

Locks when hot.
Replace IC202 (MSP3410).

Shuts down when hot.
Replace IC202 (MSP3410).

FUNCTION

No TXT. No OSD.
Check zener diode D817 (5.1V) on main PCB.

Comes on then switches to standby. Standby LED flashes twice.
(1) Check field output chip IC500 (STV9379).
(2) [OK if D505 disconnected]. Check zener diode D505 (MTZJT7736A) for leaks.
(3) [No change if D505 disconnected]. Replace memory chip NVM IC2.

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Does not got into standby mode completely; picture disappears but line continues to run.
(1) Check Q602, Q603 and Q604 in standby switching circuit. Check reservoir capacitor C615.
(2) [Above components replaced; HT not at 135V]. Replace error detector chip IC602 (SE135N).

Pulses in and out of standby. RY600 clicks each time.
Check Q601 (2SC3852A), D603 (6.8V) zener and R634 (22R) on primary side of PSU.

Degaussing incomplete.
Replace relay RY600 with part number 1-755-018-11.

TUNING/MEMORY

Intermittently channels change.
Replace tactile switches S9001 and S9002 on D board.

GEOMETRY

E-W bowing. Excessive width.
Check R870 (1R/1W).

OTHER

No OSD. No TXT.
Check zener diode D817 (5.1V) on main PCB.

Intermittently volume bar appears.
Replace tactile switches S9001 and S9002 on D board.

Incomplete or messy OSD and menus. TXT OK.
Replace IC1001.

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SONY

Service Bulletin

Date	Ref. No.	Model	FB
24.10.97	**TV07897**	**AE-4 Chassis**	
Subject			IRIS
No Power			1111

SYMPTOM

- Power supply breakdown without being influenced by other parts.
- The power supply does not switch on.

CAUSE

Soft start circuit.

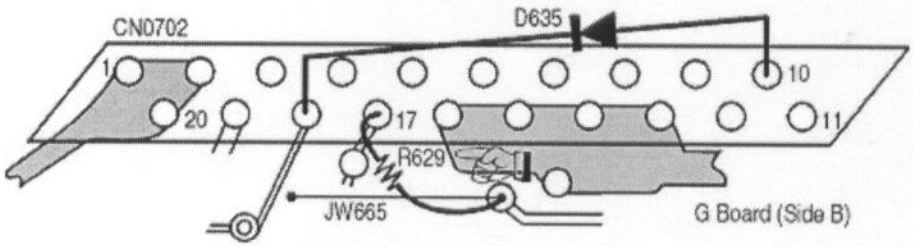
SOLUTION

Perform the following checks and modifications on the G Board. Four cases are possible.

Check	*A*	*B*	*C*	*D*
A 1.5k resistor (R629) is mounted between CN0702 pin 17 and JW665	Yes	Yes	No	No
A 1.5k resistor is mounted between the collector of Q621 and CN0702 pin 17	Yes	No	Yes	No

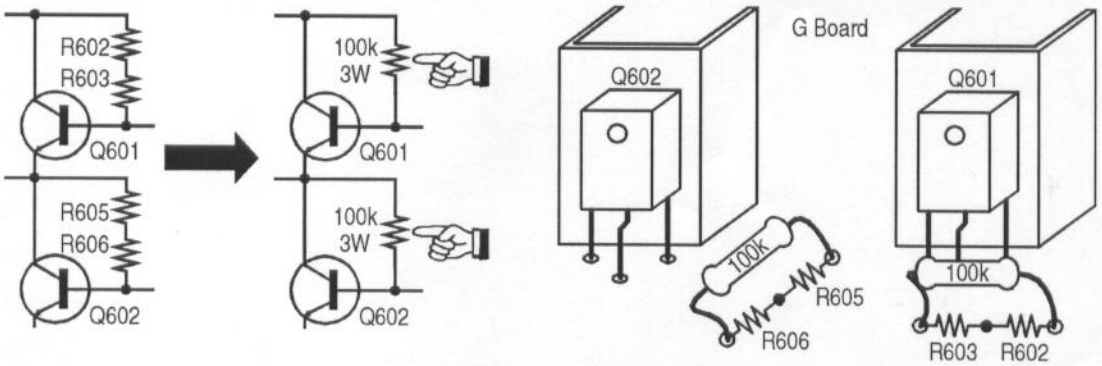
Case A

- Remove R629 (1.5k).
- Replace **R602** and **R603** respectively **R605** and **R606** with a single **100k 3W Resistor** (**1-215-929-11**).



Cases B, C and D

- Replace **R602** and **R603** respectively **R605** and **R606** with a single **100k 3W Resistor** (**1-215-929-11**).



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